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ABSTRACT

This document contains the following papers on telecommunications systems and services from the SITE (Society for Information Technology & Teacher Education) 2001 Conference: (1) "Developing and Nurturing a Dynamic On-Line Learning Community" (Kathleen Bacer); (2) "A Lecture Generator in the Web" (Jorge Kinoshita); (3) "Internet Filtering vs. Content Management in Schools" (Steve Korin); and (4) "Teachers On-Line in Africa: The Issue of Access" (Annette and Liezel Wilkinson). Most papers contain references. (AA)

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# TELECOMMUNICATIONS: SYSTEMS & SERVICES

**Section Editors:**
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**Niki Davis,** *Iowa State University*

Telecommunications systems and services are the foundation of the 'Information Revolution'. From a user services perspective it is clear that issues of systems and services are related to people as well as to technology. In this section we will focus more on access and training than on technical and software developments, as might be expected for this conference which focuses on technology and teacher education. We realize the importance of developing an infrastructure that addresses the complex issues of access and support. In our context we have experience of user services for more developed parts of the world, especially USA and Europe. Polly Mumma was coordinator of academic technology at the University of North Alabama for three years and recently she has been closely involved with user support for ClassNet online learning environment and its latest iteration, which is called Ecademy (http://webacademy.cc.iastate.edu and Mumma & Boysen, in preparation). Niki Davis has been involved in design of online services for teacher professional development with technology for over a decade, including the recent creation of an ICT Educational Research Forum (http://telematics3.ex.ac.uk/erf and Davis, 2000).

This section addresses a wide variety of topics, thoughts and interests. There is a notable range of papers from countries across the world, including several from developing countries where access issues take on a new dimension of challenge for systems and services. The primary theme this year is access, and how to best provide more equitable access to individuals. A second theme is content,which is approached from ways in which content can be made accessible and transferred across media for both teachers and learners. This is a usability approach, rather than one of instructional design. Training of systems and service personnel, including the training of trainers, is added by a further group of papers that mainly come from authors more directly associated with service centers and corporations.

One of the most interesting articles in this section comes to us from Annette Wilkinson and Liezel Wilkinson, from South Africa. They take a look at the issue of access in their country. Their concern not only lies in how to provide individual learners with access to the necessary technology, but providing instructors with access to learners. This is an issue that is equally important but is more frequently overlooked. Through the Curriculum 2005 project, they investigate how to best move away from traditional classroom models. The authors refer to this as "epistemological access". They wish to re-educate instructors and learners to think and learn in new ways, ways that will allow them to make more effective use of new technologies, as communications technology becomes available across South Africa.

Along these same lines, Nomusa Dlodlo and Nompilo Sthole, from Zimbabwe, take a look at the impact the Internet has had on education on the African continent. The focus of their research lies in how to make best use of the Internet to improve the educational systems of Africa, without increasing the divide between those countries that already have good information infrastructure and access, and those which are still struggling to grow and develop technologically.

Anthony Adams of the University of Cambridge brings us news of Ennis, a small town in Ireland, which won a competition in 1997 to become the first 'Information Town' in the republic of Ireland. Dr. Adams outlines changes that occurred in the town, as well as changes that did not occur, particularly among the town's schools. He discusses the need to change the way schools define themselves and their curriculum, if they are to continue to best meet learner needs. Maria Verdu and colleagues from the University of Valladolid in Spain also take a look at this changing definition of education. They propose restructuring education to focus on auto-learning, active learning, and pedagogical aspects of learning.

Janice Hinson leads a group from Louisiana and Connecticut addressing the issue of access and race in the

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USA. They examined two very different fourth grade classes, and the effect that access to the Internet has on these two groups. They look at the effect that access could have on learner self-image, their reading scores, and their performance on a cross-curricular research project.

As previously noted, the second main theme addressed in this section is one of content. What should the content of online material look like, and how can it be best presented to users? In this vein, we have several authors presenting new applications and tools designed to improve the online learning experience for both learner and instructor.

Firman Gunawan of Indonesia provides insight into providing foreign language instruction via the Web. This paper looks at how to best build the interactivity as well as the content needed to address the needs of foreign language learners. Similarly, Jorge Kinshita of Sao Paolo University in Brazil introduces us to a tool he has developed which allows instructors to easily produce lecture slides for online courses. Kathleen Bacer from Azusa Pacific University looks at the issue of how to develop and nurture an online community. She addresses issues such as breaking down technological and communication barriers.

For a slightly different look at the issue of providing an effective, user-friendly online environment, Fannie Cox from the University of Louisville takes a look at the virtual library. She takes a look at the services offered in a digital research library, and how that information differs from what is found on the Internet and concludes that students and educators need to recognize that differences and similarities do exist between the University Library's gateway, online catalog and the Internet. Norshuhada Shiratuddin and Shahizan Hassan of Malaysia provide a look at CikguNet, a government designed Web site aimed at improving the online learning environment. The goal is to provide a location where learners can easily access the information and resources they need. The authors provide guidelines and criteria for evaluating and critiquing the effectiveness of a Web site to meet user ease-of-use and learning needs.

The final group of contributions describes several services that are available to support the development of service centers and their trainers. Joaquin Vila, Barbara Beccue and David Doss, from Illinois State University, present information on an interactive tutorial guide to ASP programming. Active Server Page (ASP) is a hot topic in Web design, and is commonly used to provide a variety of interactive Web functions. Dennis Sharpe provides feedback on a user needs assessment conducted last summer at Memorial University of Newfoundland, Canada. He has examined a series of changes which were made, and the subsequent improvements in support services. A team from the Labein Technological Centre in Spain describe an unusual training system that focuses on critical emergency situations, developed within the European Community's ETOILE project. This may be of interest to teacher educators who are designing simulation-based training that integrates Intelligent Agents, Virtual Reality and Shared Mental Models for learning from actions on equipment and management decisions.

Corporate demonstrations round out this section. Sandy Mills from WebCT introduces the WebCT Certified Trainer Program. Joyce Bokuniewicz provides a look at the services offered by Centra and its efforts to provide intuitive, sophisticated online learning environments. Steve Korin from BASCOM Global Internet Services offers information on the issue of filtering and managing Internet content.

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# Developing and Nurturing a Dynamic On-line Learning Community

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**Abstract:** This paper addresses the issues surrounding the creation of a dynamic on-line learning community. The development of an effective external and internal environment that embraces/capitalizes on the learning process and nurtures the learner is essential. Two components in developing the external environment are the design of the interface and the effective delivery of the curriculum. Effective communication and the creation/sustaining of a partnership in the learning community are the key components in developing the internal environment. Basic strategies for nurturing and maintaining the on-line learning community are delineated.

## Introduction

Critical to any on-line learning community is the ability to create an environment that not only embraces/capitalizes on the learning process but nurtures the learner as well. While this is critical for any learning community, the on-line community sports a new arena of challenges as the dynamics of the human interface are facilitated by methods of telecommunication rather than the physical presence/interactions of students/teachers. The explosion of the internet and access to telecommunication tools has released the learner from the walls and boundaries of a physical building in which they are no longer restricted by specific time and place. This explosion is changing the way we are able to collaborate, problem solve, access and disseminate information, and engage in what is recently known as e-learning. Distance education/learning, online courses/learning, net courses, or e-learning is sweeping across the business and educational marketplace bringing to the forefront the many complexities of developing and nurturing an effective on-line community of learners. We as educators are being asked to take all of what we know so well in the face-to-face (f2f) instructional paradigm and translate it into an on-line paradigm. It is an exciting and daunting challenge. The purpose of this paper is to help with the translation!

## What exactly is a Dynamic Learning Community?

A dynamic learning community (whether f2f or online) creates a sense of buy-in, pride, and ownership of the learning. It inspires and motivates thinking, creativity, problem solving, reflection, inquiry, and constructive collaboration among all the learners. The environment created can either promote or inhibit the learning dynamics of the community.

According to Merriam-Webster *environment* means "the total circumstances surrounding an organism or group of organisms that affect and influence the growth and development of organisms." (1956, p.276). I consider environment quite a powerful word and concept that is known to sustain life and in this case sustain learning! Throughout my K-U (Kindergarten to University level) teaching career, I have experienced first-hand the influence of the environment (good or bad) upon student learning. I consider the learning environment the canvas, the background, the supporting foundation upon which everything else is built and influenced. I have watched students' behaviors/learning patterns at all different levels drastically change just because an environment was modified and/or created that supported and encouraged what I consider a dynamic learning community.

So how do we create an effective environment that will develop and nurture a dynamic on-line learning community? Well, I'm glad you asked. If you didn't, there is still time. Hopefully by now you

have noticed that although you are surrounded by text, much like many e-learning experiences, papers also have environments that are either effective or ineffective in creating a teaching/learning partnership. Notice I have written this paper in first person. Not typical for research papers I realize, but appropriate for the objective of this paper. Although I am restricted to a single-spaced 10pt black font, no graphics, sound or video, and limited interactivity, if you are able to continue to preserver through this paper in its entirety hopefully you will learn how to capitalize on the online environment and utilize its wealth of resources! So how do we create an environment that will develop and nurture a dynamic on-line learning community? First an understanding of the external and internal environments is necessary.

## Developing Environments within the learning community

Within any learning community there is an external and internal environment. Both of these environments are equal in value and must be developed and nurtured effectively. To be able to create an effective external and internal environment online, it is important to first gain an awareness of what its role is in the schema of learning.

### External Environment

The external environment is the place, so to speak, where the learning revolves. For f2f it is the usually a physical classroom/building. For on-line or e-learning it is the *interface* that the course is housed within and the manner in which the content is delivered.

Generally speaking, K-5 teachers are incredibly gifted with creating an effective external environment in a physical classroom. You walk into their classrooms and you are surrounded by a rich and stimulating environment, lots of evidence of past and future learning, celebrations of accomplishments, and reminders of content begging to influence young minds. What happens to this external environment as we progress to High School and College? The external stimulus slowly disappears and/or changes to a more stoic or what we might refer to as a "professional" look. Why? Do we not need it anymore? Is it no longer an essential component? As educators we silently justify the absence of effective external environments. We may believe students no longer need it, they have learned to control themselves, it is a distraction or we do not need to entertain them, so to speak. At the university level there are some logistics that stop the feasibility of being able to create an external environment that aligns with our courses as our classrooms are shared among disciplines. Yet I have experienced the amazing impact of creating external environment at the higher levels. For example, in a math/science methods class for pre-service teachers, together we created/decorated our own external environment. We weren't sure what impact it would have on the other classes, nor how long things would stay up, but decided as a class that we would try it. The results were amazing. I watched a whole transformation take place as students walked in the class. Students were excited to come to class, they were proud; they shared with their colleagues. Does this have an impact on learning? Absolutely! Word spread and I learned that the other classes that met in that room were also impacted. The inquiry process was stimulated, a sense of belonging and ownership in learning was fostered, and a realization that external environment is vital wherever we are learning was reinforced. So…move this into e-learning, take the awareness that it is just as important – if not more so, as you design the external environment – the interface and the development of methods of content delivery.

### Developing the External Environment

Two essential components of developing this external environment are the design of the interface and the effective delivery of your curriculum.

The design of the interface is very important. It is your vehicle for not only communicating the content of the class, but also creating an external environment. Choosing and working with the correct tools is critical. There are now many providers and course managers for on-line courses to assist in the development of a course. The most common ones are listed in the resource list. It is not my purpose here to provide a critique of each, but to equip you with strategies and concepts that will empower the utilization of any tool. Remember, it's not the tool, it's how you use the tool to create an environment (interface) and communicate your message (curriculum/content) that is important. There is always the option of building your own website/portal for your on-line classes. There are many web authoring tools and collaborative software that you can download onto your site. You need to be aware of advertisements though and the

servers that they may be housed on. Of course this requires a bit of experience. Ideally this would be the best route, but not the most likely. When considering the design of an interface, realize that no matter which one you decide to use, there will be limitations. I have found it beneficial to work around the limitations so that I can still communicate through the interface effectively. When selecting an interface to communicate and support your curriculum, consider these issues:

- Does the interface have a lot of layers to get at the information? If so, how can you eliminate them and work around them so the course is "push" technology and not "pull?" For example, there are many different interfaces for discussion groups/forums. Do they allow you to view all messages in an expanded form, view the question that is being asked in your response posting, email participants when you have responded to a posting? All of these are issues that reduce the layers of an interface and add to the usability of the learning experience.
- Is the interface transparent or is transparency easy to master? In other words, it is user-friendly and intuitive so that the interface does not hinder the learning? After one session will students no longer think about the technology and focus on the content?
- Do you always have to be on-line to edit the course? Whose server does all your work reside on?
- Do you have a complete copy of your work and is it copyright protected?
- Consider the tech support issues for the student and for yourself as the designer. Are they readily available?
- Is the interface flexible enough for you to be able to communicate effectively? Can you customize it to create the environment you want?
- If you are using a variety of collaborative tools, are they on stable servers? Are their advertisements running through them? What's the tradeoff?

In the development of my external environments I sometimes use a variety of tools to create the environment needed. For example, I utilize parts of providers and course managers that best meet my needs. I utilize ecollege for one of my on-line classes. Once I customized the environment, I found the collaborative tools very usable and students felt comfortable by the second session. I turned off the gradebook and chat room features though. I need a much more robust gradebook and virtual synchronous classroom. I prefer to utilize a dynamic virtual environment. I have created a virtual classroom within a thriving learning community called TappedIn. http://www.tappedin.org. My virtual office and classrooms are located on the 9th floor, Rm 915. TappedIn has very powerful collaborative features that allow me to move beyond the scope of a mere chat room. We can for example, creatively express ourselves (show emotions), work in groups at tables, write on whiteboards, post notes on bulletin boards, record our conversations, share resources, or create "bots" to enhance our environment. It also connects students with an active on-line learning community.

For my f2f classes, I utilize blackboard as a front portal and build supportive websites that link to appropriate sections within blackboard. Many times I stretch the interface to meet my needs. For example, I wanted a front-end in blackboard without all the layers – information that was in the face of the learner so to speak – so I built an attractive front-end website and attached it as a permanent announcement. You will find as you gain experience that the external environment will emerge. You don't have to have a "canned" environment that looks the same as all the others. Can you imagine the on-line learner that is faced with the same interface over and over again?

A dynamic on-line learning community actually allows those in higher education to have that external environment back – virtually of course! Remember environment stimulates inquiry.

Part of the external environment is also in the delivery of the content. In delivering the content on-line, variety is the key. Use a variety of ways of presenting information – audio and video clips, interactive pdfs (portable document formats) students can print and interact with offline, short presentations, and of course the utilization of web resources. I cringe when I see colleagues scan their lecture notes, videotape whole lectures, and type pages of information to present on-line. The effective ways of presenting your curriculum f2f may not be effective at all in the on-line environment.

As you utilize a variety of ways to present the information, implement a variety of activities for student response also.

**Nurturing the External Environment**

- Make sure your external environment is accessible to all your students. Create a support site with helpful resources and tools they will need to successfully execute all parts of the course (i.e., quicktime, realplayer, adobe acrobat)
- Create a photo website with short bio information
- Make available upon request online office hours in a virtual office.
- Believe it or not, brevity reinforces attentiveness, especially in an on-line environment. I emphasize the use of what I refer to as "powerful paragraphs." Everything that is posted, including my own content, needs to be a powerful paragraph - short, concise, and to the point. Remember, everyone has to read everyone else's work.

**Internal Environment**

The internal environment is all the inner workings of the learning community. This is the part of the environment we create to allow for risk-taking, intellectual challenges, creativity, the construction of new knowledge, motivation to excel, and support of the life-long learning quest. It is the internal environment that affirms and challenges the learner in collaboration with other learners. In a f2f classroom the effectiveness of the internal environment can be seen, felt and heard. Good pedagogy focuses on many strategies that lead to effective internal environments. In essence this is the he*art* of teaching. In the on-line environment, the "inner workings" are not easily seen, visual clues are almost non-existent, and gaining a sense of presence is more difficult. Effective ways of communicating and the development of a sense of community become essential and foundational. Providing different ways to communicate synchronously and asynchronously are important. There are many different interactive communication tools you can utilize. In creating the internal environment consider these:

- *Email* is the most transparent. Usually everything in a class centers around that basic communication tool. It is first layer, "push" technology.
- *Threaded discussions* allow for asynchronous communications, reflection, and interactive discussions. Author editing and being able to view all conversations/threads at the same time should be a part of this interface.
- *E-journals* are very useful for one-to-one student/teacher reflections. They are "private" and I have found them an excellent tool in establishing an effective relationship and gaining valuable insight into individual learning.
- *Virtual classroom* – while this is part of the external environment, it is also essential for building the internal environment. It becomes the synchronous environment where community is built that supports the internal environment.
- *Webliographies or data collection resources* – a place where students can share good ideas and "finds." Allows for networking to begin to emerge which strengthens the internal environment.
- *Shared documents* – All part of collaborating with each other and reflecting/learning from one another's work.
- *Videoconferencing* – If everyone has the technology and baud rates are fast enough, this has the potential of adding the human interface depth to the course.
- *On-line gradebooks* – Essential feedback tool if used to continue to allow for risk-taking, and motivation to excel.
- *Interactive quizzes and activities* – Creatively engage learners in problem solving, and construction of knowledge. Accesses the power of on-line learning.

**Developing the Internal Environment**

Effective communication and the creation/sustaining of a partnership in the learning community are the key components of developing the internal environment. Think of how you can add richness to your interactions both between students and with yourself. If students do not collaborate with each other you will have for example twenty isolate learners. They will be robbed of networking which is so much of what

learning is. When we share and reflective in a collaborative environment our perspective in chaos or at peace with others allows us to construct our learning.

In developing the internal environment work towards providing an atmosphere that is

- Affirming
- Motivating
- Stimulates inquiry
- Nurturing
- Open, accepts, values and directs opinions
- Keeps students focused
- Draws the student into the process

Organize and integrate all your best practices into the course. Invest time to create a safe environment with lots of one on one and group interactions. The process will make you a better teacher.

Finally in developing your learning community build activities to create a sense of belonging, value, and foster collaboration. I utilize a virtual classroom filled with environment and ability to "emote" (express emotions textually) to encourage the development of the learning community.

**Nurturing the Internal Environment**

Nurturing the community can be challenging but also the most enjoyable. Some basic tips to get your started…

- Get to know each student. You will actually get to know them better than in a f2f class because they can't blend in with the crowd! Intimidation is less and everyone has an equal voice with equal access to you. Many times students will open up much more on-line than in a f2f class.
- Let your personality shine through – sense of humor, intellect if you will, etc… Make sure your emails reflect a warm and caring attitude.
- Email can get overwhelming so provide students with "filtering" strategies. A simple one is to have all email subject areas start with the course number.
- Take your best classroom practices and re-think them – how can you put them on-line? Take your worst classroom practices and either make them better on-line or throw them out!
- Use technology to nurture the community and environment – not frustrate it.
- Provide constant feedback that validates/encourages and challenges/promotes further learning. Do an "attitude" check on your responses making sure they reflect the personality and support that is conducive to learning. Email and postings can easily be misunderstood.
- Maintain a sense of flexibility – things will go wrong with technology!
- Protect the community – just like you would do in a f2f classroom. Discourage inappropriate comments/actions and encourage appropriate ones.

## Conclusion

In working in an online environment, don't forget to consider possible barriers such as servers down, bad connections, download time, computer crashes, and URL's here today and gone tomorrow. Students will invariably encounter technology issues that will hinder their progress. I always encourage my students to not let the technology stop them. If anything, they get real creative!

Don't put something on-line if you can do it better f2f. Many times we give in to trends in education without thinking about the ramifications. On-line is a trend right now. If you can use the presence of the web, Internet tools, etc… to reach a depth of teaching and learning that you cannot accomplish f2f, then by all means embrace it. I have! If you can't, then don't. If you do not know how, then seize the challenge and learn – it is worth it. For example, I can not imagine teaching my "Emerging Trends in Technology" class f2f. I could never provide the depth of the learning f2f. Students would not be able to experience the immersion into the trends without being immersed on-line. I knew with this class that the

technology would empower the learning process. That's what it is all about, isn't it? On the other hand, I still didn't put it totally online. I firmly believe in initially creating the learning community f2f, making sure we experience each other's physical presence, voices, personalities and interests while establishing a common starting point with the utilization of the technology. I also have found it just as important to celebrate the accomplishment f2f at the end of the learning journey. I am teaching in an educational technology program, do you realize how much more vital this strategy is in another discipline?

By all means, give yourself time for the process of reinvention to work!

As some final thoughts to create and maintain a dynamic learning community, work towards an environment that:

- Stimulates research, reflection, responses
- Motivates participation and the learning process
- Engages and facilitates the construction of new knowledge and emerging ideas.

Your curriculum coupled with a dynamic external and internal environment, interwoven in a supportive learning community is the optimum. If your online environment is richer than your f2f environment, then you have accomplished your goal and have a viable learning community.

# WELCOME to the VIRTUAL LIBRARY
# ARE YOU PREPARED to ENTER?

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Abstract: Like so many other university libraries, the University of Louisville Libraries is creating an environment where the university community, its students, faculty and staff can access information from "virtually" anywhere in the universe. No longer does one have to physically go to a building and search the card catalog. One can search the University Libraries electronic resources from home as well. But, with this new level of access come pitfalls. Faculty and students were already amazed with the abundance of information available from the Internet and now the University Libraries has increased the level of access by making electronic resources (journals, books, and databases) accessible using Internet technology through the University Libraries gateway and online catalog. This paper will discuss the differences between the Internet, the University of Louisville's gateway and the online catalog, by demonstrating a few of the major electronic resources accessible through the Internet. And, it will enlighten faculty and graduate students on the differences and similarities of searching the Internet, the University Library's gateway and the online catalog to become knowledgeable and efficient searchers for information in today's virtual library.

## Introduction

Searching for information today, whether it is via the Internet, the public library or university library website, can be an overwhelming experience and a daunting task. Library users expectations have changed as computer technology changed. The "Virtual Library" has become a standard way of describing libraries that provide access to digitized information using numerous computer networks such as the Internet and the World Wide Web (WWW). (Saunders, 1999, p.2) Just when you think you understand all there is to know about searching the Internet, or your favorite library, something changes, or does it? The Internet and the online catalog have never been the same. Because of web technology, researchers and students looking for scholarly resources, no longer have to physically travel to the library. Instead, almost anyone can use the library's proprietary information resources from the Internet. Web technology allows the university community to search the library's web pages for its information or services at the University of Louisville (U of L) from anyway in the world. Anyone can search and find very diverse information on the Internet and anyone can also publish on the Internet. But in an academic environment, librarians have researched, evaluated, and in the case of electronic resources, contracted that information to make it accessible to library users. Library users have the convenience of using the library at home.

At U of L, one can enter the virtual library through its main web page, the gateway or the Research Center. From these two entry ramps, the patron can browse or search the online catalog and the Internet. They are not the same. But they are similar. To harness the power of the search, you begin by planning a search strategy. The goal is to take control of your time and become efficient, by planning an effective approach and understanding how it all works, whether it is the online catalog, the main library web page or "Research Center", which will be discussed later or the Internet. Each has a distinct purpose and its own computing structure and once that is understood, searching any type of online system, should become easier and more efficient, without ever having to become a computer scientist or a librarian.

## Access to the Libraries Information and Services

U of L's Libraries' main web page (see Fig. 1, http://www.louisville.edu/library/) functions as a kiosk, pointing to sources and resources of information and services provided by the libraries for the U of L community of faculty, staff and students. Examples of the type of information available from the main web page are: the hours of operation, the online catalog (Minerva 2000), ZoomText to magnify images for people with low vision, along with

other services for patrons with disabilities, frequently asked questions, library locations, job opportunities, interlibrary loan information and online request, distance learning services, instructions to access online resources from off-campus, information literacy instructional classes and much more.

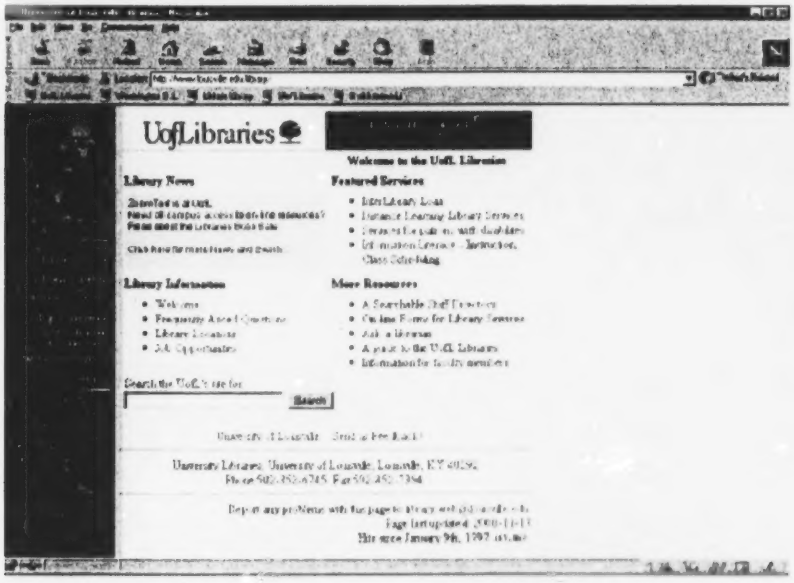


**Figure 1**: The University of Louisville Libraries' main web page to information and beyond

## The Research Center

Another information kiosk and entrance into the virtual library at U of L is the Research Center web page. It is accessible from the main page or directly from the Internet, because it has it own Internet address or URL (Uniform Resource Locator) http://www.louisville.edu/library/research (see Fig. 2). When accessed from the main library page, it is a subset of the main page and you are in a different, but specialized virtual realm. As you virtually enter the Research Center, the University communities, its faculty, staff and students have accessed yet another layer of information. The Research Center is the initial step in doing scholarly research. Librarians organize and evaluate scholarly resources both in paper and electronic to create a web page specific to a particular subject based upon the library's holdings, special collections, archives and subscriptions. From this web page, the libraries provide the user with access to digitized information: books; searchable databases; electronic journals; specialized collections; other libraries on campus and around the world. Access to full-text journal articles are available from four access points: 1) the Research Center; 2) searching the online catalog; Minerva 2000; 3) from a publisher's website and 4) an aggregator's website, most commonly known as a database. A similarity is that they each use Internet technology, but differences begin when searching and retrieving an article, abstract, or a citation. As at many other Universities and Colleges, members of the community prefer full-text articles, over abstracts or citations. Library patrons prefer to be able to do a search and have the article in a matter of minutes. Technology has made it possible and users have these expectations.

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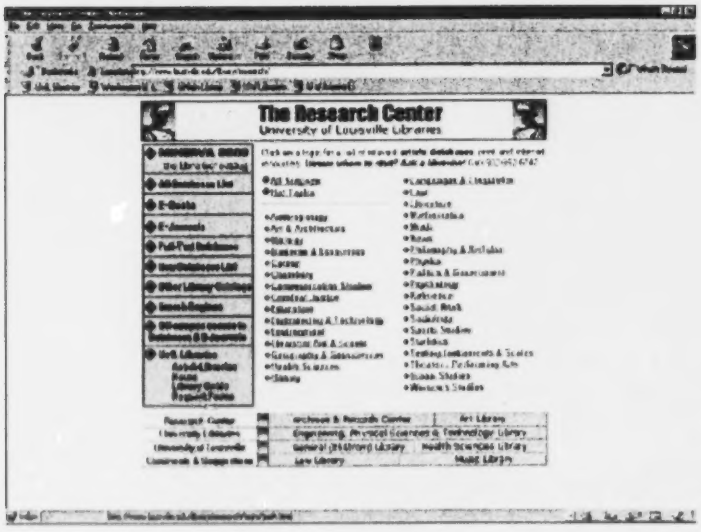


**Figure 2**: The Research Center

## Searching

Earlier we discussed the attributes of both the main page and the "Research Center." Both are portals to sources of information and services for members of the U of L community, at the library and beyond. This digitized information is stored in computers networked around the world on a publisher's or aggregator's search engine. An aggregator will broker for many journals and bundle them to sell to libraries. Due to competition for library business, publishers and aggregators will create their own platform or search engine to provide access to the journals they sell. Each search engine is similar, but unique. These characteristics will be discussed later. They all use the Internet as their vehicle to disseminate information, but that is where the similarities end and the differences begin.

### At the Library

At U of L, the main page and the Research Center are very easy to use. If a patron can point the mouse and click, then the user is already off to a good start. To use either of these web pages, a user must be able to read, use a mouse or equivalent equipment, be able to choose a button or hyperlink and click their choice. These web pages were created to be user-friendly. On the Research Center web page, each subject web pages was created with the content for the web page provided by librarians to aid users in their quest for information. Librarians use reliable sources and critically evaluate the content of all the web pages available through both the libraries main page and the Research Center.

### Minerva 2000

Several different online catalogs are on the market today. U of L has the same type of online catalog that is currently being used by the Library of Congress. Many university libraries name their online catalog. At U of L, it was named after Minerva, the Greek goddess of wisdom. There are several ways to search Minerva 2000 such as: author/title/call number, journal title, keyword, phrase, etc. Minerva 2000 also allows limits to be set to restrict the results to various preferences such as format (paper, maps, electronic, microfiche) library location, and date.

Minerva 2000 is unlike the old paper card catalog. Gone are the days when a library patron's search was physically limited to using a card catalog and paper indexes. A search in Minerva 2000 will guide users to holdings of books, periodicals, video and other media, and special collections. (see Fig. 3, http://minerva.louisville.edu).

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In contrast to searching a library for its proprietary scholarly holdings, searching the Internet provides users with information that is diverse; it goes from being scholarly to advertisements. Anyone can publish on the Internet and searching the Internet can be overwhelming.

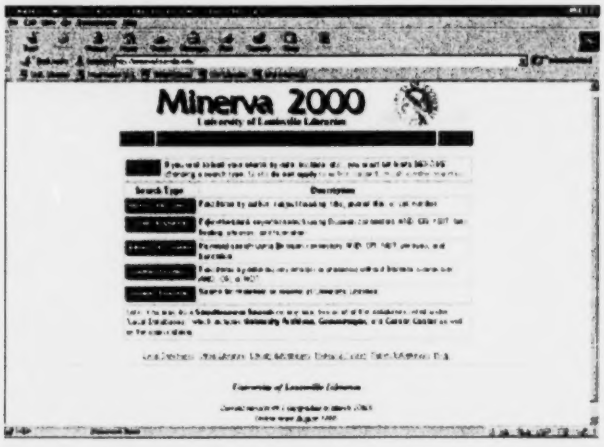


**Figure 3**: Interface to Minvera 2000

**The Internet**

All search engines are not the same, plus there are other web sources to begin the search process, such as a web directory. Web directories uses subjects to classify websites. (Fonseca and King, 2000, p.40). Similar to the Research Center web page where librarians have classified information for its subject web pages or the online catalog that allows subject heading searches. Two popular web directories are The Librarians' Index to the Internet (http://sunsite.berkeley.edu/InternetIndex) and Yahoo (http://www.yahoo.com/). Both web directories websites

**Figure 4**: Selected types of search engines

are different, but they both direct users to specific information. Librarians not only research and evaluate content for subject web pages, but also search engines (see Fig. 4). Another website that can assist users in choosing search engines or web directories is Search Engine Watch (http://www.searchenginewatch.com), which also provides the



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latest news on search engines. The table below describes the differences in features and search capabilities for searching Minerva 2000, three popular databases: ProQuest Direct, Nexis-Nexis Universe, EBSCOhost, the U of L's main library web page and Research Center, Yahoo - a web directory, and Google - a search engine. All search engines have a help button for assistance. Becoming an efficient searcher takes practice, planning, and understanding that all search engines are not built the same. In general, search engines whether they search a database, an online catalog, or the Internet, all share some commonalties. What makes them different is how they are designed to search, access and deliver information.

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*What is the "World Wide Web"?* (1996). Web Master Magazine. CIO Communications, Inc. Retrieved November 29, 2000 from the World Wide Web: http://www.cio.com/WebMaster/sem2_internet.html

| Search Type | U of L Main library page | Minerva 2000 | Yahoo-Web Directories | Google Search Engine | Database ProQuest | Database Lexis- Nexis | Database EBSCO host |
|---|---|---|---|---|---|---|---|
| **Author** | NO | YES | YES | NO | YES | NO | YES |
| **Advanced Keyword** | NO | YES | YES | YES | NO | NO | YES |
| **Boolean operators** | NO | YES | YES | YES | NO | NO | NO |
| **Browse Table of Content** | NO | NO | NO | NO | YES | NO | YES |
| **Call Number** | NO | YES | YES | NO | NO | NO | NO |
| **Course Reserves** | NO | YES | NO | NO | NO | NO | NO |
| **Date** | NO | YES | NO | NO | YES | YES | NO |
| **Essential term** | NO | + | + OR - | + OR - | NO | NO | NO |
| **Field** | NO | YES | YES | NO | YES | YES | YES |
| **Format** | NO | YES | NO | NO | NO | YES | YES |
| **Foreign Language** | NO | NO | NO | YES | NO | YES | NO |
| **Journal Title OR Title** | NO | YES | YES | NO | YES | YES | YES |
| **Keyword** | NO | YES | YES | YES | YES | YES | YES |
| **Language** | NO | NO | NO | YES | YES | YES | YES |
| **Natural Language** | NO | NO | YES | YES | YES | YES | YES |
| **Phrase** | NO | YES | YES | YES | YES | YES | YES |
| **Subject Heading** | NO | YES | YES | NO | YES | NO | YES |
| **Thesaurus** | NO | NO | NO | NO | YES | NO | NO |
| **Full-text** | NO | YES | YES | YES | YES | YES | YES |
| **Truncation symbol** | NO | ? | * | NO | ? | * OR ! | * |
| **Email** | NO | YES | NO | NO | YES | NO | YES |
| **Print** | YES | YES | YES | YES | YES | YES | YES |
| **Save to disk** | NO | YES | NO | NO | YES | YES | YES |
| **Download** | NO | YES | NO | NO | NO | NO | NO |
| **Help** | YES | YES | YES | YES | YES | YES | YES |

**Table 1**: Search type comparisons of the U of L main library web page, Minerva 2000, Yahoo-Web Directory, Google-Search engine, and databases: ProQuest; Lexis-Nexis Academic; and EBSCO host.

# THE INTERNET AS A TOOL FOR A REVOLUTION IN EDUCATION IN AFRICA: A DREAM OR REALITY

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**Abstract**

In this paper, the author looks at how the Internet can help Africa develop educationally. The research highlights the benefits that can be derived from access to the Internet for educational purposes in Africa and the problems which have caused the slow growth of Internet access in education in Africa. The author then suggests solutions to these problems in an effort to bring full Internet access to Africa as quickly as possible, thereby improving the quality of education.

## 1. Introduction

Before the Internet was introduced in Africa, (Osburn, 1999) observes that there was no other method capable of transmitting the same information and at the same time to both industrialised and developing countries. With the Internet, the people of Africa have, for the first time the opportunity to have access to the same information, and at the same time, as people in industrialised countries.

Other than giving Africans the same development opportunities as the industrialised world, the Internet is the fastest growing communication technology. According to (Molosi, 1999) it took 38 years for the radio to have 50 million listeners, 13 years for the television to reach the same mark and only 4 years for the Internet to cross the same line. By the end of 1998, more than 100 million people were Internet users. With the ability to grow so rapidly, one wonders why more people in Africa have not been able to gain access to the Internet, and have not been able to use it as an educational tool.

As the use of the Internet continues to grow, this will have profound implications on education in African countries. According to (Africa on the Internet, 2000), there are fears that if Africa does not 'connect fast enough' the growth of the Internet will only accelerate marginalisation of the African continent. As the pace of growth accelerates even more, the gap between those who are linked up and those who are not grows larger. These dangers and fears are real and should not be underestimated. Lamenting them will not stop the growth of information technology. Instead, Africa's civil society, governments and entrepreneurs need to be challenged to take advantage of the information technology revolution now gripping the rest of the world and bring the Internet to Africa.

## 2. Applications of the Internet towards the development of education in Africa

(Deutsh, 1956) states that, what we see happening today, that is, the networking of developing nations, generally began in the universities and research communities. The advantages of networks to academia were,

and still are obvious - databases are shared, conferences organized, papers circulated and discussed, collaborative research and writing undertaken, and so forth.

Universities and research in developing nations are strengthened, and the "brain drain" diminished as the Internet reduces pressure on professionals to move abroad. (Deutsh, 1956) further observes that early in the 20th century, physics research was only concentrated in a few centers, but increased international communication-journals and conferences - led to worldwide dispersion of physics research. The Internet will actually accelerate the spread of information for educational purposes to even the remote areas, which have access to the Internet.

Electronic Distance Education (EDE) is the process of extending learning, or delivering instructional resource-sharing opportunities to locations away from a classroom, building or site, to another classroom, building or site by using video, audio, and computer communications technology including the Internet. At its most basic level, EDE takes place when a teacher and a student are separated by physical distance, and technology is used to bridge the instructional gap. As a result EDE can provide adults with a second chance at college education, reach those disadvantaged by limited time, distance or physical disability, and update the knowledge base of workers at their places of employment.

## 3 Internet resources for education

In EDE students can engage in electronic discussions with each other via facilities that are available over the Internet such as newsgroups, bulletin boards and chat groups and e-mail.

Newsgroups allow students to engage in discussion groups on areas of interest. A student subscribes to a discussion group and messages to and from subscribers are distributed via electronic mail (e-mail). An electronic mail message is a document that is created, dispatched and received on an electronic mailing system. Electronic bulletin boards on the other hand store messages on central computers and users must log onto these computers to read messages that are sent to these groups.

A chat group is a service in which participants around the world can talk to each other by typing in real-time on hundreds of channels. In an example where students are encouraged to actively participate in EDE seminars, the student leading the seminar prepares a paper and submits this by e-mail to a group for consideration. Some electronic discussion follows, prompted where necessary by the tutor. After a few weeks the student presenting the seminar summarises the discussion and presents a revised paper. Management of such seminars requires skill from the tutor in judging just when to contribute a comment in order to keep the discussion going.

In organisations where e-mail is available, both tutors and students are offered an efficient and straightforward means of communication. One such application is to use e-mail to remind students of impending deadlines. Even students who are absent when the message is first posted are certain to receive the message when they next access their e-mail. Similarly any changes, revisions to assignments or hints can be delivered to all students through e-mail.

The increased numbers of students and the corresponding increase in time spent by staff on assessment has encouraged interest into how technology can be used for assessment purposes at various levels. In a fully automated assessment system all aspects of the system from the assessment which the student completes to the processing and administration of the marks, including overall management of assessment information is technology-based. Perhaps the most immediately obvious and most easily accessible use of technology to assist the assessment process is in the recording, analysis general storage and management of results. A wide range of spreadsheet packages (e.g. Excel, Lotus123) and database packages (e.g. Access, Oracle) is available over the Internet. A package is a collection of computer programs to achieve a particular purpose. Spreadsheets are used to expedite record keeping involving mathematical calculations. The numerical data can be mathematically calculated and presented in an easy-to-understand format. A database is a collection of information that can be organised, sorted and printed in various report layouts. A database package assists in collecting information into a database. Examples of information, which may be collected and stored in a database, include personal student information, records of classroom resources and student academic information.

There is a growing interest and increasing practical experience in the use of computers to deliver objective tests. Objective testing is often taken to imply the use of multiple choice questions. The creation of a bank of questions on the Internet invites the possibility of each student being presented with a paper made up of different questions, but of an equivalent standard. It is possible to use the computer to generate different tests automatically from the bank of questions. It also offers the interesting possibility of an instant computerised marking facility that allows immediate feedback for students.

Computer technology is there to aid those doing research. Communications packages that provide access to databases and archives on the Internet and explore the World Wide Web can assist with research and information retrieval. Communications software is used to search library catalogs, search electronic journals and text, and retrieve text, graphics, audio and video files.

## 4. Problems Causing Africa's slow Growth in Internet access

Internet access in Africa has slowly improved over the years, but many people in the continent are still unaware of the Internet and those who may be aware of its existence don't know how it may be of benefit to them. There are several reasons why Africa's Internet infrastructure has remained so fragile, therefore slowing down the rate at which people are able to access the Internet.

### 4.1 Interference of state-owned PTCs

According to (Adam, 1993), the state-owned Posts and Telecommunications Corporations (PTCs) involvement and approval is usually required to proceed with networking plans in the area of telecommunications in most African countries. Because, in most cases, the PTCs have rigid policies and poor management and computing capabilities, the need for approval by the PTC to proceed with any networking plans frequently hinders the progress of networking in Africa.

### 4.2 Computing Equipment in Short Supply

(Adam, 1993) highlights the fact that both hardware and software are difficult to source in Africa in terms of cost. Therefore, equipment is usually in short supply. If it is available, it is either obsolete or under utilised. In an institution, one may find mainly old mini-computers and low-end personal computers with limited application software.

One is convinced that if the policy makers appreciate the importance of computer literacy, the resources would be made available to purchase computers for schools. The policy makers would also see to it that computer education is included in the school curriculum.

### 4.3 Low Investment in Research and Development

Statistics indicate that African universities and governments invest only a small percentage of their budgets in research and development. The policies implemented by the governments may only be short-term and do not take into account any long-term research options. As (Adam, 1993) put it, "the research staff work under extremely difficult conditions. Salaries and incentives are limited and not sufficient to promote the use of modern technology for research". Usually an individual researcher or a research department in an organisation or an institution is not able to afford the costs of using computing technologies in research and development. A lack of understanding of the impact of electronic communications on the telecommunications infrastructure and the impact on research and development is one of the persistent challenges to network development.

### 4.4 Extreme Dependence on External Technological Sources

There is an extreme dependence on external donors in the area of information technology. This dependence could be in the form of finance for purchasing equipment or computer hardware and software donated to an institution. According to (Adam, 1993) this has a few disadvantages. The use of information technology is mainly limited to themes selected by donors, consultants, etc. If the donors have donated equipment which they

want to be used in the engineering department of the school, then even if there is a greater need for the equipment in the computer science department of that school, the equipment cannot be shifted there.

Despite these disadvantages, external sources are very important in bringing the Internet to Africa. They have the financial resources, which are needed in order to purchase equipment and train the system operators and users. Without them it is not feasible to try and implement a network plan in Africa which will benefit a greater part of the population. So there actually has to be a trade-off between the resources which have been donated by these external sources and the control that they have over the use of equipment.

**4.5 Journals in short supply**

Most information technology journals and magazines, with a broad range of technology assessments and updates on computers and networks are procured outside Africa. They are therefore, expensive for individuals to obtain and are generally in short supply. According to (Adam, 1993), " while journals in various fields can sometimes be found in libraries of universities and research centres, journals and proceedings on various tools for networking are generally unobtainable". This means that it is difficult to have access to the most current developments in networking.

**4.6 Lack of formal training in the area of networking**

There is an observable slack in the area of formal training in computer networking. Because of the lack of training in network design and management, and the fact that those who are skilled in the networking area move to places that offer better salaries which is usually in foreign countries, there is, therefore, a shortage of human resources in the field in Africa. In order to curb the brain drain, industries should be challenged to give salaries and conditions of services, which are comparable to those in countries, where the experts in computer networking are moving to. To curb the brain drain, industries should be challenged to give salaries and conditions of service which are comparable to those in the countries where the experts in computer networking are moving to.

**4.7 Lack of culture for sharing information**

In academic institutions and industry there is the problem of lack of a culture of sharing information, which should exist mainly in these circles. There is an unwillingness to share information and resources, maybe because of the competition for foreign resources.

With companies which are competing, this is understandable. Each of the companies wants to get ahead of the rest of the competitors by improving services and, therefore, increasing their customer base. In academic institutions, this problem leads to non-progression in the area of computer networking. If one has an idea, or information that they have been able to source, then sharing it with others will also improve their understanding and maybe bring in new insights which they had not realized before.

**4.8 Telecommunications Costs**

If the state monopolises telecommunications, there are no controls to the prices which they will charge for accessing the Internet. The problem is even compound in Africa because of the few telephone lines, which exist. (Cohen, 1999) puts it this way: "A few statistics illustrate why the basic requirements of access-a-telephone-line presents problems for less industrialized countries. Globally, 49 countries, 35 of which are in Africa, have fewer than one telephone per 100 people". The lack of telephone lines in some areas makes it difficult to cultivate an Internet culture, as there is need for a telephone line and a computer in order to be able to gain access to the Internet. Besides not having reliable telephone lines which are necessary for usage of the Internet, cost is also inhibitor to Internet access

**4.9 Counter Regulation**

The governments at times try to regulate the content of the information accessed over the Internet. According to (Cohen, 1999), this happens in countries where telecommunications are monopolized by the state. Governments can also restrict access for political purposes and economic gain.

## 5. Suggested Solutions

The problems, which have been listed in the previous section, have seriously affected the connectivity of African countries to the Internet. Although the Internet is essential, building intensive Internet connections require a thoughtful plan, long- term commitment, financial support for sophisticated Internet technology, sufficient human resources to run sophisticated networks, and in-depth knowledge of networking.

### 5.1 Sensitisation and Teaching

Sensitisation and teaching are important activities in networking. Continuous sensitising and teaching theory of networking costs system operator's time, but is most useful during the first stages of building a national network. There are several ways in which people can be sensitised on the use of the Internet.

### 5.2 Frequent Updating and Change

Networking is a dynamic area that needs frequent updating and change. Realising the fact that there is a continuous change in computer technology, there is a grave need for frequent upgrading of the equipment that an organisation has, and an improvement in the skills of the people in the field.

### 5.3 Collaborate with PTCs

Government-owned Posts and Telecommunications Corporations (PTCs) have been one of the major stumbling blocks to networking in Africa. PTCs actually claim to know much about networking than they do. If policy makers and key industry players collaborated with PTCs, they would be able to encourage each other in networking technology. PTCs should also acknowledge that electronic networking will not threaten their networks or reduce annual telephone bills but would rather improve their capacity and generate demands for newer services. In essence, this would be an advantage for the PTCs. If they have improved services, they are better able to compete with new players who come into the telecommunications market. Thus, long-term collaboration schemes should be established between community and government PTCs.

### 5.4 International Cooperation

The networking map indicates that Africa lags behind all other continents in the use of data communications technology. While the global Internet is growing at a phenomenal rate, its potential changes to society are becoming immense, and the creation of a truly global internetworked research village is becoming evident. Isolation from this global movement is still very much in evidence in Africa. African network enthusiasts can only become self-sufficient through learning from the experience of the international community.

### 5.5 Institutional Support

Institutions play a major role in promoting networks. Lack of institutional support and political will to promote a network initiative are, according to
(Pimienta, 1993) major stumbling blocks to networks in the region. To quote him directly, "Building of network user groups, supporting official structures for academic institutions such as science and technology commissions, and involving active researchers to obtain political backing from their institutions, " are ways of improving institutional support.

### 5.6 Organisation

Centralizing network activities using some appropriate organization that deals with plans, projects, results and impacts of activities is very important. Effective organisation saves money and effort in dealing with governments and different institutions. One has a set out plan and is able to follow it through sequentially.

### 5.7 Financial Resources

Technical plans and network architectures should be based on available financial resources. (Pimienta, 1993) lists the following as major costs of a network: the coordination of a network from conceptualization to implementation, the installation and configuration of a network, network support, including training (user support), the maintenance both at user level and at nation level and communication costs. Dependence on foreign assistance to cover all of the above costs makes national network overly dependent. When such donors withdraw, national networks may be jeopardised. (Pimienta, 1993) suggests methods of building cost recovery tools into the national network to help to support it. Some of these tools include institutional subscription fees, additional fees for conferences or other Internet services and training and support fees.

### 5.8 Technical Plan

A sound technical plan is also a critical element in sustaining a network. Networks should match national infrastructure and user requirements. (Pimienta, 1993) further suggests that concentrating efforts toward building large national hosts (rather than numerous smaller nodes) allows for better transmission media and continuous support for the improvement of bandwidth.

### 5.9 Wireless Technologies

Wireless technologies are actually being seen as one of the most important ways of addressing the needs of a continent with the least developed telecommunication systems in the world. (Jensen,1996) though argues that "although wireless systems can offer far more rapid roll out times, greater reliability, lower maintenance costs and better security, wireless Internet connections are also not inherently more viable than wired networks – they are more appropriate in applications where traditional solutions for some reason are not feasible or cost-effective. These traditional solutions would include access to the Internet via a telephone line and a modem.

## 6. Conclusion

The Internet is a communication tool that should not be confined to industrialised nations and begs to be utilised now to address Africa's chronic need for communications and development of education. The ushering of Africa into the new information age will be realised through a partnership of African governments, private business and donor agencies. The desirable outcome is a sound telecommunications infrastructure, decrease in access costs and equipment costs, proliferation of telecentres in rural areas, heightened computer awareness and improved communication.

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# Bilingual Web Based Learning:
# "To know the world and to be known by the world"

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**Abstract**: Web is a simplest and a cheapest technology to deliver a knowledge to all over the world. This presentation paper would tell you about our concept about bilingual web based learning (our way to know the world and to be known by the world), type of services, research and development steps in developing bilingual web based learning ,development time-line, how the human resources organized in development and operational stage ,collaborative work with other institutions, and our future plan in web based learning concept.

## Introduction

Invention of the Internet technology make everything change and move fast. Information flows very fluently make us very easy to get all information and knowledge we want and also we can share everything we know to others. We believe that to follow the change we can not move and work alone anymore. We have to collaborate with other parties , otherwise the changing will destroy us. To be have a good collaboration we need a good communication with others. Not only good communication but also we have to increase our knowledge. In order to achieve all above statement we try to build a distance Learning system through the web. Web is a simplest and a cheapest technology to deliver a knowledge to all over the world. We try to convince people especially in developing country like Indonesia that the technology is not as far as they thought before.

The course were made is a *general informal English course* especially for Indonesia or Local community. We aware that English language is a world language and to be able to communication we should have a good skill in English. Some of the courses are free to take, every body can take it whenever and where ever they want. That's the advantage of the Web!! And if you want to ask the expert you can contact them by e-mail. Another course is *Indonesia language course*. The course is intended to every body who want to learn Indonesia language. But at the first time, it is intended to help any foreigner who working in Indonesia because to be able communicate with Indonesia community it would be better if they know a little of Indonesia language. So this is the way ***to know the world and to be known by the world***.

## Web based Learning Concept

Technology based Distance Learning is defined as a system and a process that connects learners (students) with knowledge centers (Instructor, Database) who are separated in distance and need to interact in real time or non-real time. And Web based Learning is a technology based Distance Learning that used web as interface. And some people said that web based learning have made many changes in knowledge material delivery. For some parties point of view this is the most effective way compare to other distance learning media alternatives. Up to now there about three training or learning program which is delivered through web both on the internet or intranet such as computer/technical training program, business program, and languages.

There are many classification of web based learning. This article will explain some of this classification. The first classification was according to the media type:

1. Text and Graphics Web base Learning
   Text and Graphics is the simplest web based leaning application. Instructor only put the courses material on the web and student can access it very easy. But this Web based Learning type present text and graphics only then interactivity level is very low.
2. Interactive Web based Learning
   In this type, the web based learning is equipped with a quiz, self-test, text entry test, and other. The interactivity level is higher than the first type.
3. Multimedia Interactive Web based Learning

Most of training program used this model as their web based learning model because this model has a highest interactivity level. Student and teacher can communicate in real time situation, audio streaming, interactive web discussion.

Interactive Multimedia Web based Learning have the highest level of interactivity but to achieve that level we will have a highest cost than others. In order to achieve that we have to use step by step work, first of all we could build the Text and Graphics Web based Learning then we enhance the capability step by step until we achieve the highest level of interactivity.

According to instruction type there are two kind of web based learning:

1. Synchronous
   Student could communicate with their teacher and other student at the same place and time
2. Asynchronous
   Student could communicate with their teacher and other student at the same place but not always at the same time.

Finally there are four type of business model in web based learning:

1. Free courses with commercial advantage
   Usually learning institution or provider provide a free courses and everyone could follow the course without pay it. Commercial advantage could be afford with advertising or form other content provider
2. Commercial course
   This course's mode is replica of conventional courses but use web as its media. Conventional process such as registration, placement-test, and others has to be passed before student could access the material and of course the student have to pay the course.
3. Learning Application Service Provider
   Mostly, this type of web based learning business model is provided by learning tool producer. Beside sold their application they also offer a leased service. Every party could used their software and host in their application on the basis per hour and per concurrent user.
4. Learning Portal

Like another type of portal , learning portal is also a collection about any resource to learning. It could be learning material, web based learning home page, and learning information.

## Idea Generation

The idea comes up when my colleague try to enhance our English capability by send us one material a day. It was a good beginning but too bad it's not consistent because it stop when we get busy. When we busy we don't remember that we have to send our friend a
the web , we could reach all people that connected to our LAN/INTRANET. So I told this to my manager , he agreed and told me to start build this application. Then we start the idea about bilingual web based learning. We defined bilingual web based learning as a web based learning system that content or delivery process used an English and Native language as a main language. We develop a web based learning that content consists of English Language and Bahasa Indonesia with delivery language both Indonesia and English.

## Implementation Steps

**Prototype I (Oktober 99- February 2000)**

***Our Course Features***

English.

In English feature we have a number of features. Those are:

- A grammar
  We deliver this section because we aware it is a difficult part of English beside the vocabulary.
- Idiom
  This feature was made to help people learn about idioms, what is the meaning and how to use it.
- Conversation
  To help student increase ability in any conversation style like at the office, at school, in the meeting, and occasional live
- Scientist story
  We try to make our community close to science. One of our weakness is that most of our student don't have a good capability in basic science. We try to attract people through the scientist story.

- Networking Terminologies
  We work in Telecommunication and Information technology field. Then it is important to know all about networking terminology.

  To deliver this course we have two step, first we give the stdent a brief theory then we ask them to answer a simple question on the web. This is a weekly program then we will update the course every Monday.

Indonesian Course
In Indonesian course the features are:

- Grammar
  In this section we try to help people learn about Indonesia grammar, how to speak, how to read. We aware that the difficulties in Indonesia language is how to spell in Indonesia. To we think that it would be better if we add a sound feature in every Indonesia word
- Vocabulary
  The feature were intended to help people to increase their indonesia Vocabulary.

This is also a weekly program then like the english course program we will update the course every Monday.

Type of Question

As we mention in above paragraph, the course will preceded by a short material or lessons and follow by the question. There is a lot of type of question that we give to learner but in general the question flow is depicted in this figure.

Multiple Choice Question Types

There are two program that used in this type, first a program from Hot Potatoes Software and Second is developed by RisTI using Java script .The First Program is more complicated and more sophisticated that the other. It's a user interface program. And if we work with the second program, we should working from the source program but the function is same and the advantage is we don't have to buy it. We used this type of question if for Reading Comprehensive Test and Networking Terminology test, but it is possible to use this type to the other item.

Short Answer Type

There are two program that used in this type, first a program from Hot Potatoes Software and Second is developed by RisTI using Java script .The First Program is more complicated and more sophisticated that the other. It's a user interface program. And if we work with the second program, we should working from the source program but the function is same and the advantage is we don't have to buy it. We used this type for Vocabulary test, Scientist Story, and any other items which appropriate.

Matching Answer Type

The matching type now is only from Hot Potatoes software but in the future as the other type we will develop our script to make this type question. For a while we used this type question for vocabulary test and Idioms test.

**Prototype II (July 2000- February 2001)**

In this second prototype we enhance the capability of our application. First, we do an assessment of First prototype. Second, we do a development process based on analysis result. We have to know and understand the system specification bĕfore we design new system which will be developed. Through system specification we will get information about processes that needed and involved in system.

Web based learning could be specified from a different point of view :

***User Point of View***.

From user's point of view , the system consists of two service type :

1. Free System, this system is intended to user who not or not subscribed to become a member of commercial course system. The user just only need to register but he/she doesn't have to pay anything but the facility is not as much as commercial system..
2. Commercial System, this system is intended to user who want to became a member of commercial course. User have to register first and pay for the course . We will give more feature for this user..

***Facility Point of View***

From the facility point of view our web based learning are consists of::

1. User Management System is a System that function to manage user and content data base. System is consists of :
    a. Registration is a processes that consists of user items.
        a. User authorization which consists of:
            i. User ID
            ii. Password
    b. Payment method. There are two payment system : on-line and off-line
2. Interaction Facility, is a facility that function to provide interaction media or communication among instructor and student , instructor and instructor , or student and student. Interaction System is consists of:
    b. Chatting
    c. E-mail/mailing list
3. Teaching Facility, a facility that used to support teaching and learning system.
4. The content is consists of :
    a. Daily Lessons, this is a content that will change everyday. The contents are consists of :
        i. Idiom
        ii. Proverb
        iii. Vocabulary
        iv. Antonym
        v. Synonym
    b. Weekly Lessons, this is a content that will change everyday. The contents are consists of:
        i. *Idiom*
        ii. *Grammar*
        iii. *Vocabulary*
        iv. *Reading*
        v. *Scientist Story*
        vi. *Networking Terminologies*
    c. Sample Class, this is a class sample of commercial courses that consists of following material:
        i. Conversation
        ii. General
        iii. Business
        iv. TOEFL Exercise
5. Evaluation and Scoring Facility .
   This is a facility that used to evaluate especially student who take the commercial course or take a weekly lesson. This evaluatio system is consists of four types:
    - Examination (*Quiz*)
    - Exercise/Homework
    - (*Student Progress Tracking*)
    - R*eport* and Certificate
6. Supporting System,
   This is a facility that used by system administrator to administer the system, user, include create the material, quizzes, exercise ,etc.

## Resources

**Development**

First step is to obtain who is the member of the development team. Development team is responsible to develop web based learning. This team build a web based learning from the beginning, integrate the software which is needed to develop the web or customized web based learning application software that available in the market. The development team are:

1. Project Manager

The project manager will lead this development project, he oversees the assignment and flow of tasks and coordinates development schedule. The project managers might fulfilled other roles on the project in addition to management and supervision.

2. Instructional Designer

   Instructional designer for the web based learning project is the person who responsible for the teaching and learning process in web based learning that will be built. He/she should define need analysis, overall design, and often actual writing of storyboard. Storyboard are graphical and text presentation of the information that goes into each screen of the program.

3. Programmer and Database Expert

   Programmer is the one who responsible to encode the system that have been designed into a language that understood by the machine/computer

4. Software quality assurance

   Once the programming step in place, the team needs to test the applications. Software quality assurance may be apart of programming but in a large web based learning development there are some specially people responsible to maintain the software quality.

5. Subject Matter Expert

   Subject matter expert acts as a consultant in the actual of curriculum. Clearly, different subject matter expert are needed for each content. The SME are chosen from their expertise area, and work with writer and instructional designer to create the actual curriculum and training method that will be used.

6. Writer and Editor

   Writer crafts the text of the learning material. Its require communication with Subject Matter Expert and Instructional Designer. And Editor is needed to verify the grammar in the text of the curriculum and control all the material and exercise.

7. Web and Multimedia Developer

   Web and multimedia developer are responsible to design the web page , audio, video, and animation according to the result of Instructional Designer and Subject Matter Expert proposal

**Operational Human Resources**

In the web based learning operation we need a different team or different human resources.

1. Manager

   Manager Responsible for web based learning operational. He/she should maintain the web based learning operational.

2. Instructor

   Instructor responsible for delivering courses. She or he has to answer all the student question and if there are a discussion session the instructor should be able to moderate the discussion.

3. Web Master and Administrator

   Web master and Administrator handles the day to day technical support related to delivering the content over the network.

## Lesson Learned

From the experience , we have several lesson that might be good if you consider it:

a. Be detail with Design
b. Be careful when evaluate
c. Do a Beta Test and Pilot Project
d. Watch your Content Development
e. Consider your Resources (Both Content ,Financial,HR, etc)

## Future Plan

In the future we plan to continue develop bilingual web based learning by collaborate with other institution which have a different expertise (such as language expertise). And we try to enhance our facility like add some feature like bulletin board system, conferencing tools, web synchronized, etc.

## Suggestion and Summary

As we mention above bilingual web based learning is a web based learning system that content or delivery process used an English and Native language as a main language. We hope we could make it as good as possible so people from out country could learn our language easily and people from our country will learn International Language easily anywhere, anytime. From the experience we have learned, I would like to conclude:

- Technology just a medium

  The technology is just a medium then we couldn't say it bad technology or good technology. But the important thing is what the technology which appropriate for our condition and situation

- Need collaboration with other institution

In globalization era we have to know that we can live by ourselves anymore , we need to collaborate with others..

- Need a subject matter expert
  For the content, if we don't have any resources for this field, feel free to collaborate with other who has these expertise
- Allocate Resource to the fit position
  Put your resource to an appropriate place.
- Next development: Desk Top conference, virtual library
  Desktop conference is a synchronous model of Distance Learning technology. This time we are not using this technology but we still do research about this technology. We believe that desktop conference technology will growth follow the internet technology growth especially voice over IP technology. And virtual library as the supporting system for our distance learning will be developed. It is possibly a joint partnership with other library who have very good expertise in this field

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# A Lecture Generator in the Web

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**Abstract**: - We made a tool to generate presentations as HTML pages from a simple input text which can be generated in any text editor. This tool is available to public usage through a CGI script at http://www.pcs.usp.br/~jkinoshi/lecture. This paper presents how a text given in a simple notation can create useful presentations.

**Introduction**

It is common to use a computer tool (ex: PowerPoint [1]) in order to prepare a presentation. The material generated by the tool is a sequence of slides where each slide consists of:

- One title
- Many topics, organized in a hierarchical way.

In this paper we present a "lecture generator" tool that transforms a single text into HTML pages (slides) to be used in a lecture. Our approach is simpler than "PowerPoint":

- The input text has a very simple notation that can be created in any text editor.
- The output are HTML pages that can be seen in any browser, hence, in most platforms.

The tool is available for test in [2].

## Input text and output slides

Each line of the input text basically corresponds to a title or a topic of some slide. The first character of the line tells the difference:

- **title**: A line beginning with '*'.
- **topic**: A line beginning with '-'.

**Example 1:**

```
* Title of Slide 1
- the first topic inside Slide 1
- the second topic inside Slide 1
* Title of Slide 2
- one
- second topic.
- the last topic.
```

The input text from example 1 generates two slides:

- Slide 1: The slide "Title of Slide 1". See figure 1
- Slide 2: the slide "Title of Slide 2".

*Observation*: The link to the former and next page is automatically generated at the head of the slide. Example: In figure 1, the link to the next page is "Title of Slide 2".

**The hierarchy: Topics in a slide**

Each topic line can begin with one or more '-'s. The more '-'s, the lower it will be in the hierarchical structure, as it can be seen in example 2. The first slide of presentation in Example 2 is seen in Figure 2.

**Figure 1. First slide of example 1**

**Example 2: Hierarchy in topics**

```
 * Title of Slide 1
 - 1. the first topic inside Slide 1

 -- 1.1. the sub-topic of 1
 --- 1.1.1 the first sub-sub-topic of 1
 --- 1.1.2 the second sub-sub-topic of 1.
* The second slide
- some topics inside
```

**Figure 2: first slide of example 2**

**The hierarchy: Slides in a Lecture**

A lecture can correspond to a sequence of slides organized in a hierarchical way. Each title line begins with one or more '*'s. The more '*'s, the lower the slide will be in the hierarchical structure of the lecture.

**Example 3:**

```
 * Title of Slide 1
 - one topic
 ** Title of Slide 1.1
 - another topic
 ** Title of Slide 1.2
 - one topic more
```

which generates three HTML pages. The first HTML page is in figure 3:

**Figure 3: First slide of Example 3**

**Links to the "sub-subjects"**

The tool creates links to the slides at the immediately lower level (sons in a tree structure) at the bottom of the page. This is done because:
- it is common to present the great sub-subjects under some slide and
- it enhances the navigation during presentation.

Example: The Slide 1 in Figure 3 has two "sons". The two links "Title of Slide 1.1" and "Title of Slide 1.2" (bottom of figure 3) are automatically generated by the "Lecture Generator" tool.

**The table of contents**

The tool automatically creates the HTML page pa0.html that displays the table of contents. The figure 4 shows the table of contents of the example 3.

**Commands to the Lecture Generator Tool**

We created a special notation in the input text (commands) that enables figure insertion, comment insertion, etc. The commands are:

**1. mark a portion of input text as comment**

*syntax:*

```
:rem
some comments
:/rem
```

The lines between :rem and :/rem does not appear in the output.

**Figure 4 - Table of contents of table 3**

**2. keep the text as it is (ex: example of code)**
*syntax:*

```
:pre
some text that must appear as it is at the output
:/pre
```

The lines between :pre and :/pre must appear as a text at the output HTML pages. It is useful to show programming code.

**3. insertion of figure**
*syntax:*

```
+img:file
Example: figure 3: +img:florida/ex3.jpg
```

The Lecture Tool creates the HTML tag 'IMG' from this notation.

**4. insertion of a HTML link.**
*syntax:*

```
+http:anURL
```

If the user adds the character '+' before an URL (in this context, a sub-string that begins with "http:") then the HTML tags Aa and /A are automatically generated.

**5. insertion of a sub-window. It is possible to show some text during the presentation of a particular topic.**
*syntax:*

```
+[some text]
Example:
+[this is an example of a sub-window]
```

When the sub-window is declared then a HTML link to a window containing "some text" is generated in the slide. This is done by a javascript function. In figure 5, the command: +[this is an example of a sub-window] generated the link "[*]" to the yellow window containing the text.

**Figure 5: Example of a sub-window. The sub-window appears when user clicks the link [*]**

**6. insertion of any HTML tag**
Any HTML tag can be inserted using the normal HTML tag notation.

Example:
```
this is a text in <b>bold</b>
```

**The tool development**
The tool was created in Perl in a Linux machine.
The tool in http://www.pcs.usp.br/~jkinoshi/lecture uses two Perl-scripts:

- the script palestreia.pl that takes the text and converts into HTML pages.
- a CGI script that deals with the user-interface. Basically it:
  - receives the text and user email from a form,
  - applies palestreia.pl, compacts it and,
  - sends the compacted lecture to the user.

## Usage Examples

A presentation of the Lecture Generator Tool is in http://www.pcs.usp.br/~jkinoshi/lecture/pa0.html and its corresponding input text is in http://www.pcs.usp.br/~jkinoshi/lecture/lg.txt

## Conclusion

The Lecture Generator Tool creates slides as HTML pages from a very simple input text. It is available to public usage through a CGI-script. It has some advantages and disadvantages over powerpoint.

**Advantages over PowerPoint**

- Our tool organizes the slides in a tree structure instead of a linear structure.
- PowerPointer can display presentations in the web, but it becomes photos that are heavy to send. The Lecture Generator Tool generates presentations in HTML format. The HTML tags are very powerful and can be used to enhance a presentation.
- Free of charge usage by [2].
- The input text can be generated in any text editor. I recommend emacs [3] in outline-mode. In fact, emacs outline-mode inspired me to construct the lecture generator tool. A description extracted from the help of emacs is:

  ***editing outlines with selective display.***
  *Headings are lines which start with asterisks: one for major headings, two for subheadings, etc. Lines not starting with asterisks are body lines.*

*Body text or subheadings under a heading can be made temporarily invisible, or visible again. Invisible lines are attached to the end of the heading, so they move with it, if the line is killed and yanked back. A heading with text hidden under it is marked with an ellipsis (...).*

**Disadvantages over PowerPoint**

Powerpoint has many facilities that are not yet supported by the Lecture Generator Tool; for instance, it enables to create some special "effects" during the transition from one slide to another.

**Future**

I hope to enhance this tool and license it under GPL [4].

**References**

[1] PowerPoint: http://www.microsoft.com
[2] Tool demonstration: http://www.pcs.usp.br/~jkinoshi/lecture/
[3] emacs: http://www.gnu.org
[4] GPL: http://www.gnu.org

# Internet Filtering vs. Content Management In Schools

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Abstract: Educators and parents across the country have been grappling with ways of making the Internet a safe extension of classroom learning. While many schools have implemented a filtering methodology to screen "inappropriate" or "non-educational" content, there is an emerging backlash that has come to view filtering as restrictive, unreliable and counterproductive. This paper discusses the benefits of another approach: curriculum-based content management. This approach enables educators to pre-select websites that are in line with a particular lesson or in accord with that district's overarching educational objectives. Moreover, curriculum-based content management promotes focused, proactive learning. Students do not "surf the web". Within such a system, students are presented with thousands of categorized, pre-evaluated websites, turning "search time" into "learning time." Curriculum-based content management maximizes the educational value of each school's Internet investment, allowing teachers and students alike to realize the power and efficacy of Internet-enhanced learning.

## Introduction

Over the past thirty years, the Internet has grown from its beginnings as a military communications system to a tool used by individuals and organizations worldwide. Among its many supporters are students, educators, and administrators who benefit not only from broadened access to information resources, but from the ability to discuss and collaborate over any geographic distance. Among it's many applications, the Internet can enhance daily lesson plans and teaching in the classroom environment. This study examines ways the Internet can be used effectively in a classroom setting. Educators can use and accept the Internet not only as an alternative to attaining research materials in the library; but as another tool that creates interactive, higher-level thinking for teachers and students in the classroom. Educators can take advantage of the Internet in the classroom yet still remain focused on the information needed for an effective learning objective. For many reasons, educators may approach the use of the Internet in the classroom with slight apprehension. One reason is that we may be unclear as to what the Internet is and what it does. We have heard the raves about the Internet as this tremendous "superhighway" that allows teachers and students to access a vast amount of information, but sometimes educators are still uncertain as to where it fits into the classroom. The word "Internet" refers very generally to the global network of hardware and cabling that hosts information and carries it from place to place. There are many different types of information traveling through the Internet at a given time, (from electronic mail (e-mail) messages to Web pages). For K-12 schools, Web pages are doubtless, the most frequently used form of Internet information. This is most likely due to the similarity of Web pages to the pages in the textbooks that you use in the classroom. Web pages offer a way for textbooks to be taken to another level because the Internet provides a dynamic new way to create interactivity. Educators are familiar with using traditional textbooks inside and outside of the classroom environment. At times a main objective for an educator may be to find interesting and dynamic ways for students to become engaged in the texts and provide a way that will create the students' willingness to read and absorb the information. On the other hand, students may feel that the textbooks are unexciting or not interactive. Interactive tools and materials make it easier for students and teachers to relate mutually to the information conveyed. The Internet provides an interesting and unique way for students to relate mutually with each other and with their teacher. Students respond to the Internet with great enthusiasm because of its ability to be an interactive form of traditional textbooks.

## Harnessing The Internet

The Web, a world community on the Internet has proven to be a tremendous tool for conveying information that can be used to facilitate learning and convey knowledge which can then be used for learning activities. However, there IS a common, major problem for educators. There is *so much information* that attaining a grasp on it may be difficult. The system is disorganized and teachers may feel as if there is no way to control it for classroom use. Educators are left with a giant system that provides information but in a disorganized and confusing fashion. It's like a library where all the books have been placed randomly in the stacks. The solution is a simple one..... creating software which organizes Internet content and makes it a beneficial tool for the classroom, computer lab and library. The development of content management software, thus allows for the "educational" shaping of the Internet within the school environment and provides educators with the ability to select Internet based information based upon classroom curriculums. Pre-selected, focused, content replaces the timely and cumbersome practice of "searching" for appropriate content while precious classroom time passes by. Students reach appropriate content FAST, maximizing their online time through "on task" learning. Websites can be selected from the vast volumes of Internet information and presented to students based on appropriate State Education Department K-12 curricula, across the breadth of subjects taught in our nation's schools. How can we develop FOCUSED resources and present them to students in the educational setting? Rather than use a "shotgun" approach by providing a "friendly" or "kid-safe" search engine as the vehicle, educators can offer pre-qualified Web-based curriculum resources via a drill-down menu system allowing students to get to the information they need quickly. This results in a more motivated student and a learning environment where students CAN complete the assigned tasks. The Internet was NOT designed for classroom use, a fact that explains many of the difficulties schools have had in trying to integrate its various offerings into their existing curriculums. As rapidly as schools are being wired, so too have rumors spread of functional weakness, perilous legal exposure, and loss of CURRICULUM FOCUS. Superintendents are often overwhelmed by the challenges of integrating Internet content into established methods of supporting school curriculums. And few vendors seem to have an answer that meets the educational requirement of supporting currently accepted curriculums. Yet, no one can deny that, properly deployed and managed, the Internet provides dynamic educational opportunities that extend far beyond the borders of classroom walls. When you think about it, your school is better prepared than you think to deal with Internet access issues: You already choose the books to include in your library and the materials to fill out your curricula. Thus, you have always managed educational content, in one form or another. Internet access will be no different, provided that you have the correct technology and a forward-thinking attitude. In planning for this new technology, superintendents may find themselves having to think about technical issues in addition to curriculum and overall administration of districts. Among the technical issues are: Integrating technology, while...Addressing parents' and school boards' concerns, while...Handling repercussions of educationally-inappropriate content being accessed on school grounds. Facing the threat of litigation through exposing students to "inappropriate material", while...Budgeting for the cost of setting up and maintaining a system,

*Dealing with the fear of the changes that such a system will mean for your well-established curricula.* As most of us are aware, schools across the country (and around the world) are scrambling for Internet access in order to take advantage of the rich content and communication ability this medium offers. More and more schools are integrating Internet content into their curriculum for some very simple reasons: It makes learning fun and interactive. It dramatically expands classroom resources. It makes students comfortable with research and reference sources. It opens students to cultures beyond the classroom, and breaks down the walls inherent in any learning situation. It enables communication with the global learning community. Internet access bridges the gap between technology and education. In general, it provides three elements that are crucial to bringing a school forward, arming it for future developments in curriculum delivery: 1) Effective and managed Internet access with content security, electronic mail, chat communication for community-building and peer strategizing, and access to educational materials and environments far beyond the classroom. 2) Network technology along with the connectivity, infrastructure, and speed necessary to effectively compete for bandwidth now and in the future, wiring a school for its Internet and *Intra*net needs. 3) Dynamic curriculum integration that fulfills a school's educational objectives for the next millennium, reducing preparation costs while providing students with dynamic, fun, and effective educational value. Web sites perform a similar function to textbooks but in a dynamic new

that prevent access to specific Web site addresses, or to key word approaches that remove or block-out pre-determined words appearing in the text. Defined as such, filtering software provides a partial response of *removing* a danger. But what is *added* with this approach? It has no curriculum-based goals, it does not provide an alternate solution, and it *adds no educational value*. With all of the resources available to educators on the Web, the filtering response unfortunately approaches Web technology in the classroom as a formidable force that can only be managed through reducing a teachers' choice. Curriculum-based content-management is, however, a positive educational choice. This choice is in order for an Internet solution geared toward the educational community: *Guided, classroom-focused and curriculum-appropriate access* only to previewed sites – either self-defined by a school, or tested and approved by the guidelines of an educational advisory board. This system uses a different strategy than filtering software: A school starts by defining their "Allowed List" of sites to support their curriculum. These sites naturally are linked to State curriculums for K-12 across subject areas and naturally lead students down a path that fits the school's learning objectives, and keeps students focused on lesson plan objectives. This philosophy mimics the way in which educators have traditionally selected books and other printed materials for classroom discussion and library use. It places Web access accountability on educators and schools. A distinct benefit here is that a COMMUNITY DEFINES IT'S OWN STANDARDS for Web access, rather than accepting a corporate definition often found in filtering software solutions. It's simple to define access. A school can do this by using one or more of the following methods: 1) Use an educational portal such as an educator-developed school website as a rich access point, with sites broken down by curriculum area. Unfortunately, this is a time-consuming task and considerable effort must be given to development and maintenance of such a site. 2) A school can create its own "Allowed Lists" of sites which students can visit, and make these lists available to students in a number of ways without creating a school website. Lists can be tailored for different schools within a district, or different subjects within a school. However, giving students "allowed lists" as word processor documents with hyper-links is perhaps an inefficient solution. 3) Make use of the many educational sites already in place by universities, museums, government entities, and other schools themselves. Many educators and organizations have already constructed Web pages containing multiple access points into educational Web sites. Curriculum-based management removes concern over what content *will* enter the school environment. It's always up-to-date, dynamic, and channeled into age- and curriculum-appropriate educational objectives, just like any other classroom resource. Let's look at some of the common questions and concerns people have when implementing an educational solution as discussed above. Your educational and community peers are concerned about a definable number of important issues: 1) Are sweeping policy changes required? Teachers and parents are often concerned that the Internet will radically change the way schools operate. Given what" been written about the *dangers* of the Internet (and the dearth of information on the sometimes overwhelming *benefits* of

access), it's no wonder. One of your roles in guiding your peers through this process is to reassure them that there is, in fact, nothing to fear with this new technology. Whether it's administrators concerned about content or teachers concerned about learning new technology, you'll know how to choose a system that will keep their students safe *and* give them dynamic content that seamlessly integrates into their curriculum and your school environment. 2) What policies must we put in force? Choosing curriculum-based management over filtering software provides an easy, painless solution that really requires no particular policy, and no definitions of what is inappropriate for your students. Educators merely pick and choose what they need from the Internet (with help from a K-12 categorized library of sites) appropriate to the curriculum, age group, and study topic of your students. There's no need for educators or parents to worry about what will enter the classroom environment: educators have gained true management of the Internet. 3) Who defines what is "appropriate," and doesn't this vary by the student's age? Through a curriculum-based management system, *you* define where the students *go*, no where they *shouldn't* go—just like the way you've always done it. There is a distinct advantage to this since your "allowed" sites are not defined by a software company, but by educators in your school. Sites are agreed upon by those within your community. This approach enables educators to present educational Web content in a manner consistent with the way support materials have always been selected and used. Overall, this is the most natural way of dealing with Internet access. Furthermore, a solution such as one based on an Internet Communications Server offers group management, letting educators set up classroom groups, or choose content for labs and individual computers on the school network. This powerful feature assures are-, curriculum- and topic-specific Web content. 4) How is such a system maintained? Maintaining the system is extremely simple. An "administrator" program lets educators easily set up "allowed" sites, and can make use of the sites chosen by educators who review and select sites based on State and Regional curriculum guidelines. If students attempt to access a site that has not yet been "allowed", they see a friendly message; then they have the option to send a message to their teacher requesting the site's addition. Teachers can then examine the site and, if it is valuable, quickly and easily add that site to the Allowed List. This feature demonstrates the flexibility of an Internet Communications Server. Anyone who has ever operated a computer can easily pick and choose their options using the tab-driven tools in the user software. With the use of exclusive passwords, educators can use full Internet research capability on computers they choose. Choosing a curriculum-based management solution over filtering software automatically reduces concern over liability by allowing educators to choose sites just as they choose books for their library or curriculum. This gives educators comprehensive management of Internet content, while using password protection and a secure, server-based design to assure that only educators access the management settings.

## Child Safety on the Internet

Like any highly populated community, the Internet has a dark side. Along with the positive contributions—online libraries, interactive museums, and access to cultures far beyond the boundaries of the classroom—there are negative influences: individuals who use the Internet harmfully to serve their own ends. Fortunately, managing the risks can be much easier here than it would be in an actual community. The challenge for educators is to replace the negative influences with true educational value. Filtering solutions used in school settings cannot always provide a totally "safe" solution because must always update so-called "not" lists based on the ever-growing number of undesirable sites found on the Internet. This is tantamount to the little boy whose finger in the dike is all that stops the onrush or the North Sea! Sooner or later, that type of approach will fail. Content-management, therefore represents a *proactive* approach: educationally valuable content, locally controlled, FOCUSED on specific K-12 curriculum as opposed to the old "reactive" approach. As an added measure of support for applications where educators choose to use selected computers in an "unrestricted" mode, popular "filtering" technology works *transparently* within the system to shield users from these common inappropriate areas: 1) Violence/Profanity, 2) Partial Nudity, 3) Full Nudity, 4) Sexual Acts, 5) Gross Depiction, 6) Intolerance, 7) Satanic/Cult, 8) Drugs/Drug Culture, 9) Militant/Extremist, 10) Sex Education, 11) Questionable/Illegal/Gambling, 12) Alcohol & Tobacco. Also, filtering is provided on sites deemed to be "productivity reducing" in the educational workplace: Sports, Entertainment, Games, and Humor. Any site on the Internet, however, can be "allowed" globally, or on a computer work group basis as well as on an individual computer. Therefore, for instance, a Physical Education teacher might choose to have certain

Sports related sites "allowed" on computers within his supervisory area. A librarian might also choose to have certain Health related sites available in the library, not generally allowed to the school population. This type of *proactive* solution allows educators to control their own preferred Web sites and to map out a *safe pathway* through the Internet. Another feature allows teacher the ability to create electronic "worksheets" called *PROFILES*, which present students with a learning task and the appropriate targeted websites the teacher has chosen for student use. Only those sites as well as textual instructions for the students are shown on workstations. Profiles are an additional way youngsters are kept on target and maximum focus can be maintained during a limited classroom or lab period. Providing such a "safe-harbor" for learning allows the Internet to be a wonderful resource for learning and exploration as it revitalizes the educational setting. As in many other facets of life, care must be used when introducing children to this resource. Using a content-management approach to provide educational resources supportive of accepted educational curricula provides a *proactive* solution to this challenge.

## Creating Empowered Learners

In today's media-saturated world where children of all ages passively feed on an array of disjointed images and messages, furthering proactive and focused learning has become perhaps THE biggest and most important challenge facing our nation's schools. Rather than having students sitting in a classroom while teachers "lecture" and a few "motivated" students participate while the rest merely mark time, it is imperative that we turn teachers into "facilitators" and students into inquisitive learners. Teachers acting as -guides" facilitating "learning adventures" using Internet technology has been shown to promote a*ctive* learning. How, then, can we foster such learning? A curriculum-based approach to Internet-enhanced learning patterned along the lines outlined in this paper, will go a long way toward facilitating this process, creating dynamic classrooms brimming with energized teachers and proactive learners.

# An Application for Training and Improving Co-ordination between Team Members, Using Information Technologies.

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**Abstract:** As most of the daily situations are handled by teams in the current world, the necessity of training teams which collaborate in order to solve situations in time-pressure scenarios arises. This type of training is complex; it may also be difficult to carry out periodically and besides, crucial information can be lost with the existing training systems. In order to increase the effectiveness of systems that promote learning by individuals, teams and organisations involved in the emergency resolution and to raise the frequency and quality of trainings. We present a training system based on a methodology, which integrates Intelligent Agents, Virtual Reality and Shared Mental Models for learning from actions on equipment and management decisions to be performed in emergency scenarios. We describe its application to the resolution of an underground fire emergency developed under the ETOILE project funded by EU. The system can be applied to other scenarios.

## Introduction

In an increasingly complex world where most of the daily situations are handled by teams, the importance of the team training in the task of overcoming emergency situations is well known. The value of employing information technologies in these scenarios, for completing the existing training systems, leads us to present a methodology which integrates traditional trainings, individual computer based trainings (CBTs) and live emergency drills with collaborative training systems for teams, based on advanced information technologies.

Training individuals and teams that must work in emergency situations is complex for several reasons: the number of people involved in the situation can be high, the disruption caused may be expensive and the equipment involved costly to operate. It may be infrequent for similar reasons and also

because agreeing on a common training date is not easy when the people involved belong to different organisations.

The most common existing trainings in complex time-pressure scenarios and emergency situations mainly consist of: theoretical trainings, specific trainings for each role and situation, and real drills. Most of the times, real emergency drills are considered the best way to improve co-ordination between the people involved in the emergency situation, however the high level of complexity of the trainings, the low frequency and the lack of realism are the reasons that make convenient for these drills to be complemented with another training systems. So the purpose of the developed training system is not to substitute the existing ones, but only to compensate the known drawback of the existing trainings and complete them.

## Technologies Integration

The paper is based on the work developed in the ETOILE project (Environment for Team Organisational and Individual Learning in Emergencies). The project is funded by the European Union in the context of the ESPRIT programme. ETOILE proposal consists of technologies integration and the system proposes to apply jointly three raising technologies: Virtual Reality, Intelligent Agents and Shared Mental Models. The ETOILE system is designed as a distributed virtual 3D environment where trainees cohabit with intelligent agents.

### Virtual Reality

In order to make the user (trainee) feel like into the real world, the training takes place in several computers, one for each of the trainees, and a 3D view of the participants and the environment is shown to every trainee (Fig. 1). In the Virtual Reality, the user has the possibility to navigate through the virtual world, interact with objects and participants represented in the scenario and even simulate communications by clicking on the corresponding devices. Changes in the environment and scenario are easy to perform and there is no need to use costly equipment. With the Virtual Reality interface, the trainees can be located at different places, connected by a network, and all they work together into the same virtual world in order to solve the emergency situation.

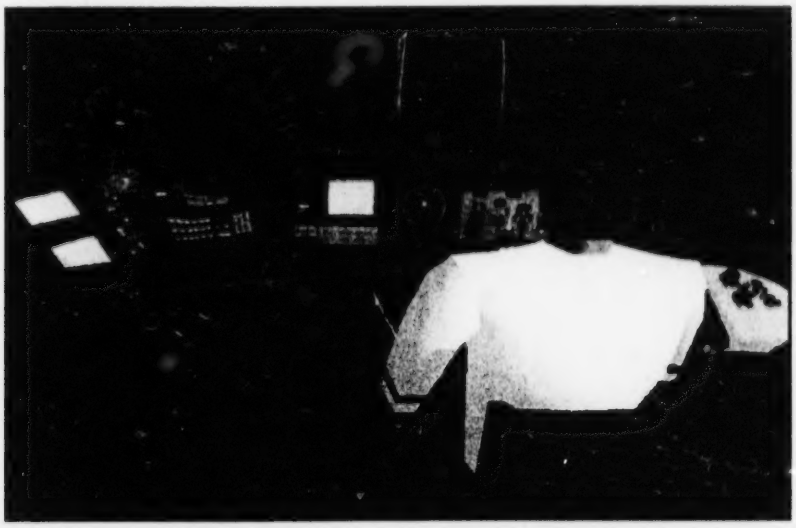

**Figure 1**: Virtual 3D view of the Train Driver in his cabin during the training session.

**Intelligent Agents**

Intelligent agents are software systems that can act by their own and react on incoming events or messages. In the ETOILE project two different kinds of these agents are included; behavioural agents and pedagogical agents. Behavioural agents are agents whose behaviour in the system is described as human-like, they plan and react like humans participating in the emergency situation. In the training system, not all the roles in the emergency situation are taken by humans but intelligent agents are used to take them over. These agents substitute humans and make the system available even when only some of the people involved in the emergency are available. Pedagogical agents are agents with didactic functions whose main task is to help the users to perform the tasks and achieve the goal in the emergency situation. Pedagogical agents increase the system ability for the communication between the trainee and the computer by giving assistant and advise during the training session.

**Shared Mental Models**

When humans do not work alone but together with other people in a team the concept of shared mental models appears. Shared Mental Models describe how the single team members proceed in developing a common "mental simulation model" that allows the team to make predications and estimations of the current situation. Shared Mental Models are implemented in the behavior of the agents. Two kinds of these models appear most frequently in the ETOILE demonstrator scenarios, compensatory and anticipatory knowledge. When messages between participants are passed by a third party, this intermediary has the opportunity to compensate for missing or incorrect information. Besides, people sharing information received by other participants or equipment are in the position to anticipate request to actions. Knowing that all the participants have a shared mental model of the training session, one of the participants can receive a feedback message from any other one when the action is not the appropriate one. The usage of these models significantly improves the training benefit. These ideas are taken into account for the communications between participants. Based on the same ideas, the system includes learning support tools, these tools help the trainer to make an evaluation of the training and the trainees after the session.

## System Development

The technologies described above are used in the ETOILE project in order to develop two demonstrators. The system aids to complete the training of the personnel involved in the resolution of two specific emergency situations: an incident in a power plant and a fire emergency in an underground tunnel. Labein is developing the application for the second scenario, this scenario has been chosen due to its complexity and completeness. In this scenario lots of people belonging to different organisations are involved. Metro Bilbao personnel, security guards, paramedics, fire brigade and the emergency services dispatching centre. The aim of the system is to complete the training of the Metro Bilbao personnel who are in the emergency central dispatching room and the train driver of the train on fire. In a training session the trainees and the trainer are seated in front of their PCs. The trainer selects the scenario, the situation, the role of the participants and the current conditions of the training before the session starts, the trainer can also start, stop and pause the session and even introduce external events during the session. Every trainee enters in a 3D environment (Fig. 2) where a detailed representation of his workplace is shown, every participant in the session is represented by an avatar either the humans or the agents. The humans interact with the environment to perform their task during the emergency situation, task performed by each of the participants are updated in every of the VR windows. There are mainly two kinds of actions: equipment manipulation and communication with another participants. The main communications devices are simulated by the system, in this case (telephone, talk channel, megaphone, train-ground system, etc.). The system also includes a pedagogical agent, the assistant. This agent is in charge of monitoring the participant actions and give advice and assistant to the trainees. The training support tools included in the system give support for the evaluation of the training done by the trainer when the training session is over.

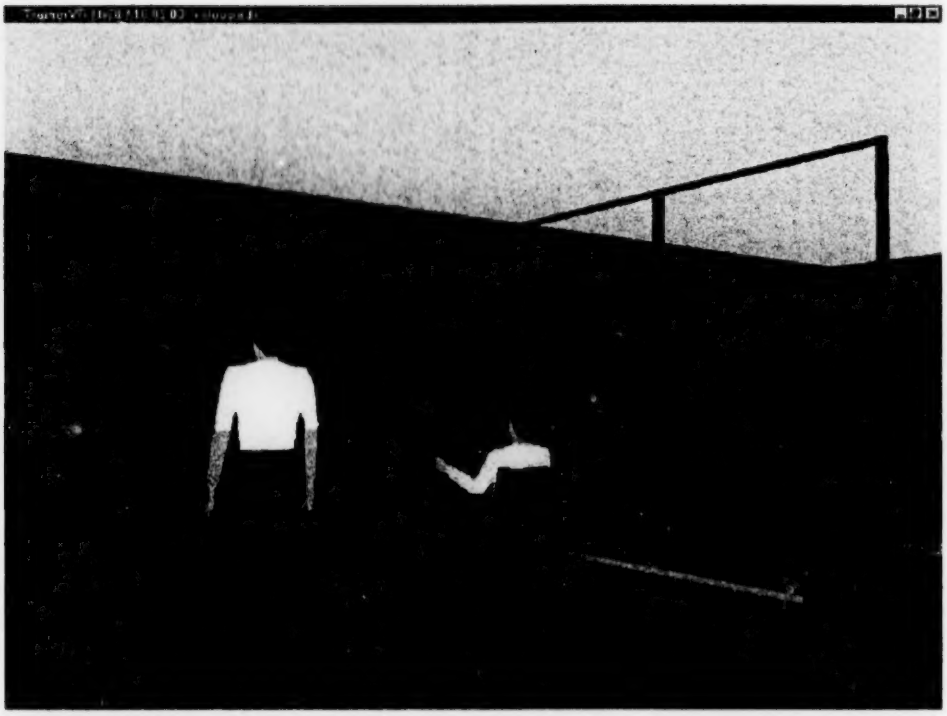

**Figure 2**: Participants in VR Emergency Central Dispatching room.

## Conclusions

The use of the system facilitate the trainees to improve their co-ordination and decision making during the emergency situation. The application features enable the simulation of equipment malfunctions, which would be tedious to reproduce in a live emergency drill. All the main tasks involved in an emergency situation are reproduced during the exercise. The trainer can choose between the emergency scenarios provided in order to cover different situations and achieve a complete and adequate training. Different means of communication are used between the participants in the session and all these communications and devices are simulated by the system. Complementary learning support tools are provided by the system for the monitoring, supervision and evaluation of the learning. At this moment the project is in the phase of integration of the partners developed work.

The ETOILE consortium consists of two Spanish companies as final user, Metro Bilbao (Underground company of the city of Bilbao) and Iberdrola (Spanish electricity provider). Two German institutions as authoring tools developers, research institute Fraunhofer-AGC and the company STN Atlas Elektronik. Two Spanish centres as leaders developers, the authoring tools are used to develop two applications or training scenarios one by each of the Spanish centres. The first one developed by LABEIN Technological centre, deals with a fire emergency in a Metro tunnel. The second one, about an emergency in a nuclear power plant, is developed by Tecnatom and Iberdrola, two Spanish companies. The other partner of the project is the University of Lancaster located in the United Kingdom, as learning support tools developers and they also evaluate the benefits of the system.

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## Acknowledgements

The paper is based on the work developed in the ETOILE project (Environment for Team Organisational and Individual Learning in Emergencies). The project is funded by the European Union in the context of the ESPRIT programme. The ETOILE consortium consists of the following institutions: LABEIN, METRO BILBAO, IBERDROLA and TECNATOM from Spain, Fraunhofer-AGC and STN-Atlas Elektronik from Germany and the University of Lancaster from the United Kingdom.

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Virtual reality interface and behavioral agents defined in the Underground Demonstrator are based on Metro Bilbao procedures.

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# The WebCT Certified Trainer Program: Modeling Online Teaching and Learning with Industry Driven Standards

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**Abstract:** Written by professionals with extensive online teaching and learning backgrounds, the WebCT Certified Trainer program goes beyond typical technical training and was designed for those who are tasked with teaching others how to use WebCT and how to create instructionally sound courses. This discussion-based program focuses on the techniques, strategies and methods for integrating teaching and learning principles, learning styles, building online communities, and includes discussion on other topics such as intellectual property, copyright, academic honesty, and accessibility. This paper explores the research and educational philosophies behind the program, and highlights why over 90 institutions around the world have become involved and what they are saying about the program.

## Introduction

The WebCT Certified Trainer Program is a program that extends beyond typical technical training and explores the world of teaching and learning online. It is a full-bodied program that is designed to give professionals who are responsible for delivering WebCT training an opportunity to discuss best practices and expand their skills in several learning environments. This paper provides an overview of the WebCT Certified Trainer Program, including why it was created, a description of the characteristics of the target audience, the educational philosophy that forms the foundation of the program, and the outcomes of the first year of the program. Included is an analysis of pre and post assessment data from 156 workshop participants.

## The Purpose

Developed by Murray Goldberg and a team of students in 1995-1996 at The University of British Columbia, WebCT was one of the first fully web-based examples of software that provides a set of tools that enable instructors to perform typical instructional tasks through a Web browser (Goldberg et al., 1996). Early adopters of WebCT and other programs were typically technically savvy instructors who were seeking to "push the teaching envelope" in some way, by providing online communication pathways, self assessments, self-paced tutorials, or collaborative learning spaces. They tended to have a high tolerance for learning new methods. As the popularity and importance of teaching with online courseware grew, institutional early adopters turned into trainers and/or mentors for the next wave of instructors. There is evidence that instructors in this "second wave" learn differently. They commonly need to have the benefits explained in concrete terms to their personal situations and have different professional development goals than the "entrepreneurs" (Hagner, 2000). There has been a lag in further developing faculty to use technology in teaching. This "chasm" has been defined as the gap between "visionaries"--customers who seize on new gadgets--and more mainstream "pragmatists" who need convincing before they buy (Moore, 1999). To further complicate matters, many of the early adopters were self-taught and were not formally trained in instructional design, Web design, accessibility or teaching and learning research. Therefore, there is also often a gap between their training agendas and what the instructors need to learn.

As WebCT educational specialists traveled from campuses to conferences in 1999 conducting training and consulting, it became increasingly apparent that while institutions everywhere had committed to online education, they were voicing the need for higher quality online course development, and the need for higher quality training.

Understanding that individuals tasked with explaining the software to instructors have a perfect opportunity to spread strong online teaching and learning practices, WebCT developed a program to certify individuals who could exhibit such strengths. Since many institutionally based trainers may not have had formalized trainer training, certification was seen as an effective way to ensure trainers practice a structured training delivery method that allows for awareness, practice and feedback (Walter, 1998). A development team of WebCT professionals was formed, and the problem was defined: how do we help others become effective WebCT trainers while also contributing to the improvement of the overall quality of teaching and learning online?

## The Target Audience

The team was able to categorize institutionally based WebCT trainers into three groups and identify potential strengths and weaknesses with each type. For example, the first group was defined as those who are considered "techies" and have been chosen as trainers because they have knowledge and experience with the technology. Often they receive little training on educational foundations or effective training techniques. Many of these folks do not have experience teaching with technology, but instead have been expected to maintain it. They know all about the buttons, and enjoy showing all of them. Their knowledge and passion for the technology is often their greatest training strength. With appropriate coaching and training, they can become empathetic to those who are not as technologically savvy, and can build a repertoire of teaching and learning examples for their WebCT training duties. The second group identified consists of instructional designers or curriculum specialists who are responsible for supporting technology needs of faculty along with helping them to design instructionally sound courses. Often these individuals must work hard at staying informed about new advances in technology fast enough to stay ahead of their faculty. They believe in instructional design and pedagogy, and are excited to use technology as a vehicle to transport their teaching and learning messages. They typically want to know best practices for introducing technology, and best design for delivering training. The third group of institutional trainers for web-course development consists of faculty who have learned how to use the product, and because of their early adoption of online teaching, they are often volunteered to aid with the professional development of their peers. These early adopters often have enthusiasm for and knowledge of the product based on experience, but lack a well-rounded set of technology skills that are necessary for training faculty. Most understand innately what works and what doesn't, but they may or may not have matched their techniques for online teaching with current research.

Understanding that these three groups of trainers have varying skills, competencies and needs, and there is an overlap of job responsibilities, WebCT defined four competency areas for achieving certification status. They are: 1) Presentation Ability, 2) Audience Concern and Empathy, 3) Knowledge of WebCT and Related Technologies and, 4) Pedagogical Understanding. Industry standards for similar programs were researched, and research on online teaching and learning and corporate technical training was utilized. It became clear that this program fell in the middle of teacher education, online teaching and learning, and technical trainer training.

## The Program

### Step 1-WebCT Knowledge Test

The program begins by gaining experience using WebCT and building online teaching environments. Since content knowledge is crucial for any trainer, the program is designed for advanced users and not to bring beginners up-to-speed rapidly. For this reason, it is highly recommended that one spend at least one semester working with WebCT before entering the program. A study area with sample test questions and study aids is available to help guide candidates who seek greater knowledge of WebCT. The WebCT Competencies for Online Facilitation and Course Design (http://webct.com/certify) is available to help individuals prepare for this test and the subsequent step, the Train the Trainer Workshop.

The WebCT Knowledge Test (WKT) is designed to test both product knowledge and a basic level of proficiency with instructional design, Web design, and teaching and learning principles. The test consists of 2 parts. The first part is a practical test, where each test taker is given two hours to put together a sample WebCT course based on a specific set of directions. The second part is a multiple choice, short answer, and matching test. To obtain a passing score, one must obtain a score of 75% or more on both parts.

**Step 2-WebCT Train the Trainer Workshop**

More important than the actual web course platform is the need for teachers to understand the pedagogy that drives each course. Simply teaching instructors to "point and click" may increase the number of teachers using technology, but will not improve the quality of online learning environments, or the quality of online teaching. Best-practice organizations claim to keep their focus on teaching and learning issues, and not just on the technology, and see faculty development as a series of steps that include addressing pedagogical application of technology (APQC, 1999). The workshop portion of this program focuses on online pedagogy, and begins in an online environment, where exemplar online course design and online facilitation are modeled. The curriculum involves research and discussion on the topics of: building online communities, good teaching practices, learning styles and theory, as well as important issues such as copyright, intellectual property and accessibility for the handicapped. The exit requirement for the online component is a portfolio that is uploaded into the Student Presentations area of the course. The portfolio deliverable is a job aid that the participants can use after the workshop at their own institutions to integrate teaching and learning resources while training others to use WebCT.

The face-to-face portion of the workshop is led by a WebCT Master Trainer, and comprises two days of discussion-based activities that emphasize the online materials. In addition, participants have the opportunity to demonstrate effective presentation and teaching techniques while receiving feedback from peers and the WebCT Master Trainer. The competencies used for final evaluation are further investigated, and the participants are asked to reflect on the workshop and their training skills before scheduling the last step for certification, evaluation.

**Step 3-WebCT Certified Trainer Evaluation**

The final phase of the WebCT Certified Trainer Program is evaluation, where the certification candidate conducts a live training session, incorporating and demonstrating very specific program competencies for this summative evaluation. The candidate either requests an onsite evaluation or submits a videotape of a live training session. A WebCT Master Trainer then evaluates the trainer against the 4 competency areas. A detailed evaluation report is written with suggestions for improvement. A team of master trainers then decides upon the certification status. Since the entire process is intended to facilitate mentoring and coaching of trainers, if the candidate is not successful during an initial evaluation then a second evaluation is granted with more feedback and more suggestions for improvement.

## The Outcomes

The individuals who registered for the Train the Trainer workshop consisted of individuals who support faculty, instructors, administrators or managers, network or server administrators, and others. Of the 156 who were surveyed, the participants consisted mostly of individuals whose job it is to support faculty. The makeup of the participants indicated that network and server administrators comprised only 5% of the entire group, whereas faculty maintained 17% of the group.

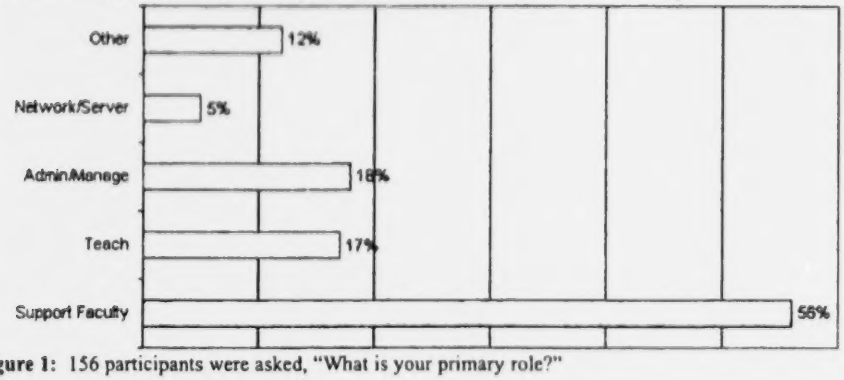


**Figure 1:** 156 participants were asked, "What is your primary role?"

Participants were asked what percentage of their current role is dedicated to training, including time spent coordinating, conducting, producing materials and planning for training. Only 15% of the 156 participants appear to be full-time trainers whereas 82% of the participants have other responsibilities besides training. It is interesting to note that 3% have no recognized responsibility for training, but were interested enough to enroll in the program anyway.

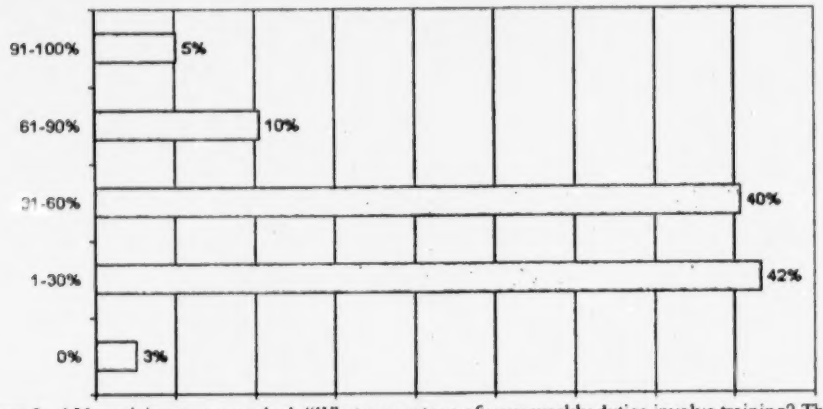


**Figure 2:** 156 participants were asked, "What percentage of your weekly duties involve training? This includes coordinating, conducting, producing training materials, and/or planning."

Participants indicated very favorable growth in comfort levels for incorporating the philosophies of learning styles, good teaching principles, and building online communities while conducting WebCT training. These comfort levels were assessed at the beginning of the workshop, and then again at the end of the workshop. Positive growth in comfort levels was seen in specific survey questions, as well as in the comments area of the survey. The area of content that showed the greatest increase in was learning styles while conducting WebCT training. The Percentage of respondents for each comfort level is outlined in Figures 3, 4, and 5. Anonymous comments submitted from the participants also indicated an extremely consistent perception of growth from the experience. A few comments have been included below:

- *This workshop provides many good examples from both the course designers(s) and the other participants that are very beneficial. Talking about "good teaching principles" is no more helpful than simply lecturing students - engaging the participants and providing concrete examples is as essential for WebCT training as it is for courses delivered in any other setting.*

- *It put my focus back on WHY we use these tools and not just the HOW of the tools. I will now include these practices in my future trainings.*

- *I do not have a lot of experience in teaching. This training has really helped me to focus on things other than technology.*

- *This was very good information for me. I feel much better about my knowledge base. I have so many great links and now feel like I belong to a great community of trainers... to all in the class and the great facilitators. Thanks!!*

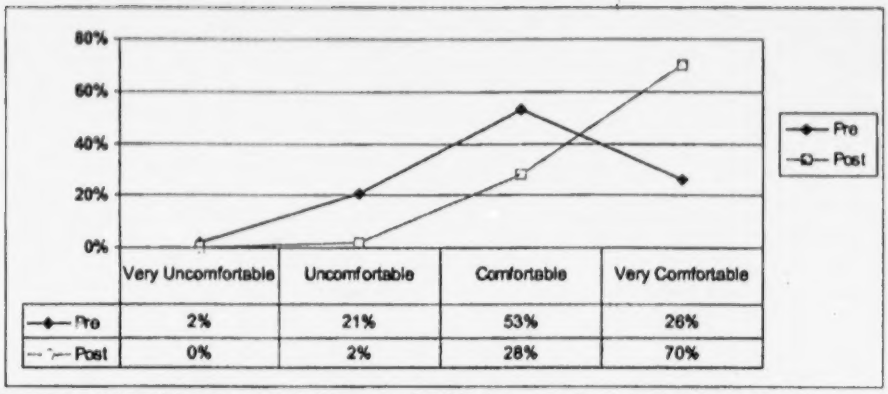


**Figure 3:** 156 participants were asked how comfortable they were discussing learning styles with instructors while conducting WebCT training in an introductory survey and then again upon exiting the workshop.

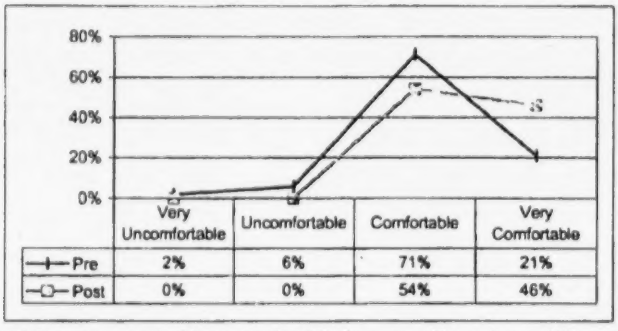


**Figure 4:** 156 Participants were asked how comfortable they were discussing and illustrating Good Teaching research with instructors while conducting WebCT training in an introductory survey and then again upon exiting the workshop.

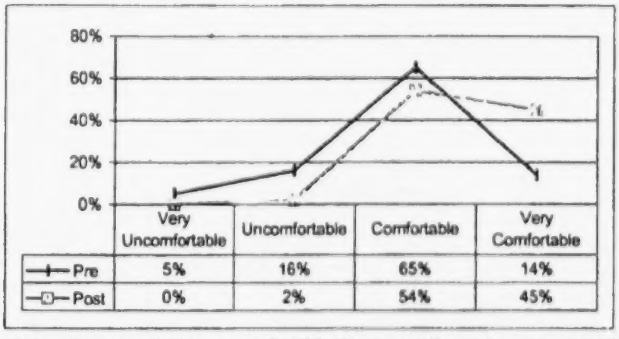


**Figure 5:** 156 Participants were asked how comfortable they were discussing ways to build online learning communities with instructors while conducting WebCT training in an introductory survey and then again upon exiting the workshop.

## Summary

The outcome of this program is the creation of a community of certified trainers who not only teach the "how" (button-clicking) but also the "why" (educational purpose) when teaching others about WebCT and online learning. Access to a private discussion and document sharing area is one of the benefits of attaining certification, and within this area continued community building, educational materials and best practices are shared. The program is definitely unique, and is determining what the industry standards are for certified trainer programs in education. The impact this program has on the world of online teaching and learning is being tracked through close communication with its graduates and continued assessment and evaluation of the program.

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# Using Information Technology Applications to Support Distance Learner Services

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**Abstract:** This paper presents a brief summary of a comprehensive report that documents the results of a needs assessment of a sample of university distance education students engaged in degree courses during the 1999-2000 academic year. The intent was to examine the current use of available student services and to determine, based on the expressed needs of distance learners, the kinds of multimedia, interactive support services that should be developed to enhance student success and retention in an increasingly competitive market

## Introduction

Post-secondary institutions in North America are rapidly expanding distance program offerings through both traditional print/mail formats as well as through variations of tele-learning that include video-conferencing, tele-conferencing and on-line web-based courses. Such approaches are being driven by escalating advances in information and communications technology. The demand for distance delivered programs continues to increase nationally and internationally, with institutions competitively reaching out to clientele who do not want the inconvenience of more conventional on-campus full-time programs. However, despite these trends, the provision of services for distance learners has tended to receive much less attention, yet such services are considered a vital component in linking students with the institution and helping to ensure student success. Almost all universities and colleges maintain web sites that enable current and potential students to access a wealth of information. The use of on-line course registration systems also continues to grow. Many other students support systems, however, tend to be less evident; and individual distance course support services vary widely by both institution and program. A review of such services is both appropriate and timely.

## The Project

For over 30 years, Memorial University of Newfoundland through its School of Continuing Education has had an extensive (and expanding) involvement with distance education. Current annual course registrations are over 11,000. In July 2000, the School conducted a needs assessment of distance support services as part of the initial phase of a project to ascertain: (a) the use of current services by students taking distanced delivered courses; and (b) the kinds of services and support structures such students would like to see developed. The results of this assessment, it was anticipated, would then be used to inform the second part of the project. This would involve the development and testing of new and/or improved distance learner support services that appropriately utilise current interactive media technology. The overall intent was to further enhance the delivery of distance programs and courses, provide exemplary services to students regardless of time and location, focus on products that are learner oriented, and to increase student retention and success.

The needs assessment survey involved an extensive phone interview of a random sample of approximately 200 distance students engaged in one of a number of degree programs, but with a primary focus on students who were located in Labrador and/or were completing courses toward a Bachelor of Technology degree. The semi-structured interview included questions pertaining to respondent technological competencies, their access to technology, use and evaluation of current support services, and the kind of resources they considered would be of help to them and to new distance learners.

A profile of study participants reveals that 43% were taking correspondence courses, 23% web-based only courses, and 34% at least one course by each of these methods during the 1999-2000 academic year. Their ages ranged from 19 to 54 years (average 31.7 years), 48.7% were female, 53.6% were single, and 82.9% were working full-time in addition to studying. The number of years that had lapsed between their current program and any prior one ranged from

zero to 29 years, with over 27% saying it was at least 10 years. Over 92% had access to basic internet technology, however the quality of this service was generally considered poor in the remote areas of the Province. In terms of the use of basic computer- based technology (email, word processing, using on-line resources and web searches), 80% felt fairly comfortable. Many though, were less certain about their ability to send or receive files, configure software or take part in on-line forums.

**Some Identified Needs**

As a group of distance learners, respondents expressed a wide variety of individual needs. Where applicable, these were grouped under common themes for analysis and discussion purposes. The most frequently identified need was for help with time management. This was not surprising given the work and/or family commitments of many respondents. Also it is not an uncommon problem with many other groups of adult learners, and points to an area in which to develop appropriate support services. Other identified needs were more detailed course outlines for program planning and course selection purposes, personal and program counselling, a toll-free help line, continuing education contact information, and improved communication and feedback during courses. Most respondents also indicated that they would make use of CD or on-line resources that addressed such things as research writing skills, library orientation, more advanced internet searching, and preparing for tests; and over half said they would make use of, if made available, on-line services such as a Afrequently asked questions@ web site, a campus bookstore merchandise catalogue, a peer mentoring system, and a virtual student lounge. It was also apparent that a fair number of respondents needed help simply adjusting to university courses as well as with many of the fundamental aspects of "being a learner". A few also expressed feelings of isolation as a student and not being part of the university community. The latter perception was, however, greatly reduced where there was frequent interaction between students and with course professors through, for example, email, chat groups, and on-line forums.

**Issues and Challenges in Developing Distance Support Services**

Whilst there were commonly identified needs, it is apparent from the survey (and other research in this area) that distance learners represent a diverse group when combinations of personal competencies, life style and geographic circumstance are taken into account. For those with the requisite technological competencies and tele-communications access, the development and provision of quality support services is much less onerous, and enable service providers to make use of a variety of current technologies, typically internet based. For some learners, the development of basic technological competence will almost certainly need to precede engagement in interactive computer and/or web-based services, and could perhaps be embedded into the introductory sections of a university program or course. By contrast, for those students with the competencies, but with, for example, poor internet access, alternate technological solutions for some support services would be appropriate. In particular, CD-ROM based delivery might partly address some of the identified needs of distance learners, especially if such multimedia was interactive, user friendly and adult learner based.

Despite advances in asynchronous communication, most respondents expressed a need for a combination of live (person to person) and on-line forms of communication, depending on the kind of service or help they were seeking. It was also evident that such support mechanisms need to be available at times other than during regular work hours. Ideally, this could involve a central contact source at the university, easily accessible by two or three communications means, who can either deal directly with diverse student issues/problems, or point the student to a source that can help (but not give that student the "run-a-round"). Communication with distance learners can also be enhanced with up-to-date web sites that are appropriately cross-linked, catalogued and referenced within an institution. This would likely reduce the demand for personal communication.

Overall, the results of this needs assessment affirmed the need for a number of existing student services and also revealed a number of new directions to take. Evidence of varying levels of technological competence and availability, as well as diverse student backgrounds and needs, suggest that a "one solution, one approach" perspective is neither appropriate nor advisable. Many of the services that respondents expressed a need for could be made available through the application of appropriate technology. Some of these services might obviously be linked to, or integrated into, existing services; whilst others would require fairly extensive development, especially to meet the needs of a diverse group of distance learners.

# Web Sites Usability Evaluation Guidelines for Teachers: A Case of CikguNet On-line Environment

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Abstract:
Web usability is one of the important factors that determine the success of a web site of any type, especially web learning environment sites. Teachers, who have the intention of developing on-line teaching materials, must take into consideration the issue of usability not only during the development process but also when the web site is being implemented. This paper describes a usability-testing model, which is then applied to evaluate CikguNet web site. CikguNet (at http://www.cikgu.net.my), is one of the well-known web sites for teachers in Malaysia maintained by a governmental agent MIMOS and is designed as an environment to assist teachers in producing quality teaching and learning materials especially materials that are technology based, for teachers to exchange their educational ideas or materials and serve as a resource centre for academics and teachers. CikguNet proves to exhibit a high usability level with only few usability problems. The usability-testing model proposed in this paper is intended as a guideline for teachers to adopt.

Keywords: web usability, usability criteria, usability model

## Introduction

As the number of web sites on various subjects is increasing over times, the issue of web usability has become very important. Publishing a web site is a very easy job to do even by a primary school children, but to produce a usable and useful web site would not be as easy as one would think. Usability is a concept that is related to the design aspects of web pages that not only make sense to people who use them, but also allow users to easily get the information they look for. Usability problems should not be considered as a minor issue as there are many examples of cases to prove that usability problems could affect on-line sales and customer visits to a particular web site (Rowland, 2000; Seminerio, 1998).

Considering these, web designers must take into consideration the issue of usability not only during the development process but also when the web site has been published. This means that designers should regularly evaluate their sites to maintain and improve the level of web usability. To perform the evaluation, however, designers need to measure their site against relevant usability criteria. However, many web design guides differ between each other in terms of coverage and level of technicality. In addition, some of them are too exhaustive and difficult to follow by the non-technical people. With this in mind, this study attempts to propose a model of web usability criteria for teachers who intend to develop a web site for their teaching purposes. This model was tested on CikguNet web site, one of the well-known web sites for teachers in Malaysia.

## Methodology

Content analysis method was used to analyse the usability literature such as web design guides, textbooks, and journal articles. Based on the analysis, a total of 40 generic usability criteria were identified as suitable for teachers web sites. These criteria were then grouped into 7 main categories, abbreviated as SCANMIC (Screen Appearance, Content, Accessibility, Navigation, Media Use, Interactivity and Consistency). This model was then tested on the CikguNet web site. The evaluation on CikguNet was done on 22nd November 2000 involving two expert reviewers. In the first stage, the experts spent 1 hour exploring the CikguNet site so that they could get familiar with the site. Then, in the second stage, they reviewed the site for 1 hour by using the listed criteria. During the review, both experts will determine the score (0-5) for each usability

criterion. Two pentium Personal Computers were used, one with Local Area Network Internet access and the other with 33Kbps modem Internet access.

## Web Usability: the SCANMIC Model

Gathering from various literatures on web design and usability, the researcher has identified 40 generic criteria of web usability. These criteria are then clustered into seven main factors, abbreviated by the researcher as SCANMIC. These factors are as follows;

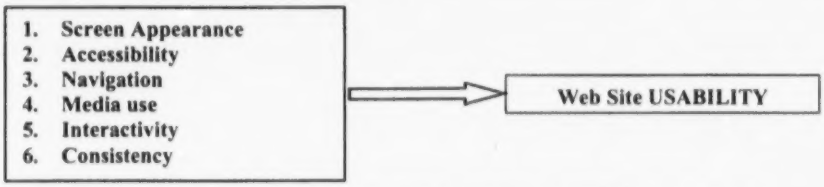


**Figure 1: Seven categories of criteria that determine the usability of web sites**

a) **Screen design**

Screen Design can be divided into 4 sections: space provision, choice of colour, readability, and scannability (Shirley, 1999; Morkes and Nielsen,1998). Space provision refers to proper allocation of space for web page elements such as menus, advertisement banners, and content display to help users focusing their attention. Choice of colour, emphasises the need to use proper colour in web page design not only to attracts users but also improves learnability and ease of use. Readability concerns with the issue of providing a readable content within web pages. This is not easy to be achieved because reading from a computer screen is different from reading from a paper. Nielsen (1997) argues that users read 25 per cent slower from a computer screen than a paper. Therefore, designers must take into consideration issues of on-line writing including type of fonts, leading and legibility, page appearance, word and letter spacing, and typographic colour. Apart from readability, designers should also consider the issue of scannability, the concept whereby contents are chunked into smaller parts so that the users could skim rather than read (Morkes and Nielsen, 1998).

The proposed criteria for screen design in this study are shown in table 1 as follows;

| |
|---|
| • Sharp colour contrast between text and its background |
| • Use of fonts that are easy to read and commonly used |
| • Different text sizes to differentiate between titles, headings and texts |
| • Clear page titles |
| • Clear headings and sub headings for general text/ document |
| • Short paragraphs (not more than 6 short sentences) |
| • Use of typography and skimming layout, for example, bold fonts and highlighted words |

**Table 1: Web criteria for Screen Design**

b) **Content**

The question of what should be on a web page depends largely on the goals of the web site. Some intend to sell products and service, some offer free entertainment, some provide government information and so on. However, one should bear in mind that providing content in a web page is not as easy as providing a printed page in a book. Yet, a designer should not run away from the basic elements of a document to ensure a web site's usefulness.

There are four basic elements of traditional document design; *who, what, when, and where* (Lynch and Horton, 1999). ***Who*** here refers to information in a web that tells who the owner is. ***What*** refers to the question of "what is a web site offering?". This means that users must have some kind of ideas of what to browse when they are at the main page of a web site. The third element, ***When,*** highlights the need to specify the date a piece of information and a particular web page are published. It also emphasises the issue of currency or timeliness of an information in a web page. Finally, the ***Where*** element that relates to the

need to inform users on the whereabouts of servers they are browsing from. The criteria for content design use in this study are shown in table 2 below.

- language used is suitable for audience
- High quality writing, for example, good grammar and no typographical error.
- Information of authors of articles and other text documents is provided (e.g. names and affiliations)
- References or sources of articles and other text documents are provided
- Background information of the site's publisher(site's owner) is clearly stated i.e. logo, name, address, phone number and email address
- Resource date
- Choices of language for multi-ethnic audience
- Links to other relevant sites (list of schools, education authorities etc)

**Table 2: Web criteria for content designs**

c) **Accessibility**

One of the goals of having a web site is to attract visitors as many as possible from various locations. The basic way to achieve this is to ensure that the site is accessible to target users. By the word 'accessible', it means that users would not only be able to get connection to a web site but also able to browse all contents available. The higher the degree of accessibility, the higher the level of usability. There are three elements of accessibility: *loading time, browser compatibility, and search facility*. Loading time is the time it takes for a network PC to download data and files from a server. Apart from loading time, designers should also consider different browsers used by surfers across the world. Although users might use two popular browsers of Microsoft Internet Explorer and Netscape Navigator, the browsers might differ in terms of their product versions. The proposed criteria for web accessibility are shown in table 3

- Acceptable loading time (10 – 20 seconds depending on the contents of the page)
- Compatible contents for all main browsers (e.g. Netscape and Microsoft Explorer)
- Compatible contents between different versions of the same browser

**Table 3: Web criteria for accessibility**

d) **Navigation**

Some people believe that the best site contains lots of graphics, animation, and colours. However, not many realise that the basic of an effective web site is its navigability. In her 'Designing Electronic Material' article, Parker (1999) states that good navigation in a Web site is comparable to a good road map. With good navigation, users know where they are, where they've been, and where they can go from their current position. In short, navigation is the key to making the experience enjoyable and efficient. The criteria for navigation are listed in table 4.

- Main menu/ list of key categories of contents in the main page is provided
- Links to the main page in all sub pages is available
- List of key categories of contents in all sub pages so that users do not have to go back to the main page to browse other pages
- Contents should be grouped into a small number of key categories (not more than seven)
- Small number of steps/ links to arrive at a particular information (not more than 3)
- Accurate/ unbroken links
- Use of sitemap

**Table 4: Web criteria for navigation**

e) **Consistency**

There is an element of 'fear of the unknown' when users visit a web site for the first time. Although they might be familiar with the browser and hypertext application environment, the design of a web site is different from others. Some web sites might put the menu bar at the top of screen, while others might use a

horizontal hypertext button at bottom of the screen. Some web sites prefer using frames to divide functional areas while others merely use colour boxes. Therefore, there will always be some elements of unfamiliarity on behalf of users when the visit a web site for the first time. In considering this, design consistency is important to speed up user's learning. The main criteria used for consistency are shown in table 5.

| |
|---|
| • Consistent page layout, for example, screen size for content display, banners, and menu bar. |
| • Consistent use of text in terms of its type, font size and colour. |
| • Consistent use of navigational aids, for example, menu bar, buttons and links in terms of graphics metaphor, size and colour. |

**Table 5: Web criteria for consistency**

f) **Interactivity**

Interactivity is a broad term and can be misleading. However, the researcher is referring this word *to features in a web site that facilitate a two-way communication between users and site owners or other pre-assigned personnel.* Additionally, the features allow users to give feedback and comments on any issues raised by the web site. The introduction of the interactivity features such as email, guess book, on-line forms and net conference might enhance a web site's worthiness. The key criteria for interactivity are listed in table 6.

| |
|---|
| • Availability of features for users' feedback about the site, for example, web master's email address and on-line form. |
| • Availability of features for sharing ideas and discussions, for example, e-forum, net conference and net chatting |

**Table 6: web criteria for interactivity**

g) **Media use**

The use of media such as graphics, images, animation and audio in web pages distinguishes it from information presentation on papers. Studies on on-line electronic materials have shown that the integration of this media keeps users attention and, when used effectively, can enhance usability. However, designers should take extra care when introducing all these elements as improper use of them may distract users and affect usability. Additionally, heavy utilisation of media elements consumes web site server's hard disk space and lengthens the downloading time. The main multimedia elements are sound, graphics, images, audio and video (Web Workshop, 1999). The list of criteria for media used are suggested in table 7.

| |
|---|
| • Use of continuos/ time-based media (audio, animation and video) to suit context, for example, demonstration, instruction, speeches, and songs. |
| • Alternative access to any information presented through continuos/ time-based media (audio, animation and video) |
| • Use of static media (graphics and images) to enhance the information being presented |
| • Non-excessive use of static media (graphics and images) in all pages |
| • Use of thumbnails to display photos with the option available to see a large image |
| • Information or warnings on file type and size for downloading |

**Table 7: web criteria for media use**

## Case study: Usability Evaluation of the CikguNet Web Site

The proposed SCANMIC evaluation model was used to evaluate the CikguNet web site (http://www.cikgu.net.my). CikguNet is a portal site specially developed for teachers by Mimos Ltd., one of semi-government IT-based companies in Malaysia. This site can be considered a one-stop-centre for teachers who are looking for teaching related materials as well as general education news. In addition, this site also provides a platform for teachers to share ideas and discuss on certain important issues pertaining to teaching and education in primary and secondary schools in Malaysia. As a portal site, CikguNet also provides opportunities for teachers to register for free web space, email facilities, web development tools and discussion forum.

In general, it can be said that CikguNet web site has a high level of usability with a total score of 71 percent. Three factors; interactivity, screen design, and consistency contribute significantly towards this with 100, 91, and 87 per cent score respectively. This is followed by navigation and accessibility that score

fairly well with 77 and 73 per cent respectively. Two more factors fell below 70 per cent level with 56 per cent score for content and 54 per cent score for media-use, the lowest of all. The summary of the results is presented in table 1 and figure 1 as follows.

| No. | SCANMIC Factors | No of Measuring criteria | Score | |
|---|---|---|---|---|
| | | | *Overall* | *Percentages* |
| 1 | Screen Design | 7 | 32/35 | 91% |
| 2 | Content | 11 | 31/55 | 56% |
| 3 | Accessibility | 3 | 11/15 | 73% |
| 4 | Navigation | 7 | 27/35 | 77% |
| 5 | Media use | 7 | 19/35 | 54% |
| 6 | Interactivity | 2 | 10/10 | 100% |
| 7 | Consistency | 3 | 13/15 | 87% |
| | Total | 40 | 142/200 | 71% |

**Table 8: Summary Results of CikguNet Web enUsability Evaluation**
**Note: each criteria was given a score between 0 to 5 by the experts**

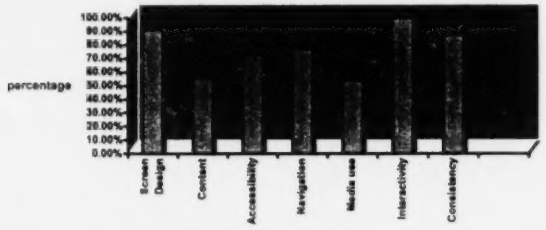


Figure 2: CikguNet Level of Usability

From the evaluation, it can be concluded that in general, CikguNet was properly designed and well maintained. The choice of colour for this site is appropriate and suitable for the audience. Similarly, the use of fonts and their sizes, the arrangement of paragraph and the space allocation for text lead to high level of readability. In addition, the level of scannability is also considerably high due to clear titles, headings and sub-heading in each page, the use of short paragraph and effective typography and skimming layout. Apart from this, CikguNet is also easy to be accessed by users who use different type of browsers. The other good aspect about CikguNet is the availability of contact addresses, online forms, online survey and forum facilities that constitute towards a very high level of interactivity. Also worth mentioning is the use of graphics and images that are effective and not too excessive.

Despite its strengths, CikguNet also has some usability problems that might affect its usage. The major problem comes from the screen design structure of the main page that is too long, scattered and could be confusing. From our study, we found that the main page is as long as 6 screen pages and the list of contents are scattered on the left and right-hand side of the screen. To make things worse, the main page is jumbled up with links and advertisement banners. In addition, the news section (Berita Pendidikan CikguNet) is also included in this page with several broken links. Using the lowest modem connection with 33kbps and a pentium 133Mhz personal computer, the main page took about 5 minutes to load, which is too long and unacceptable.

Apart from the main page, this site also has some usability problems affecting the design of the whole site. The major problem is the content design that scores only 56 per cent as shown earlier. The lowest score is caused by several criteria violations such as no authors are stated in the news section (Berita Pendidikan CikguNet), no reference or sources in some articles in several sections, for example, teaching tips section (tip mengajar), no resource date (except news section) and no page revision date. Another aspect of

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usability problems that needs improvement in this site is navigation. The low level of navigation was contributed by the poor design of the main page. In addition, there is no site map available for this medium-size site. This study also reveals that Cikgunet has a low level of accessibility for text-only browsers because there is no labels (alt tag) for graphics files.

## Discussion and Conclusion

This study reveals that the proposed model could easily be used to evaluate any web sites including the sites used for educational purposes. This is because all the 40 criteria used in this model are generic in nature and therefore they are applicable to all type of web sites. Also worth mentioning is that the usability criteria proposed in our model are designed to be used by both non-technical and technical people. Hence, teachers who are not very good at web publishing can use the model to evaluate their sites. The outcome of the testing shows that CikguNet is highly 'usable' contributed by high level of readability, scannability, consistency, interactivity and accessability. This study also identified a few major usability problems found in CikguNet that need urgent attention to improve its usability. Nonetheless, this study also has its limitations. First, the content analysis of the usability literature was based on the interpretation and judgement of the researchers. Second, 5 out of the 40 criteria used to evaluate the site are subjective criteria, which means that the interpretation of one reviewer might differ from others. Finally, this study only employed two expert reviewers.

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# Electronic Tutorship Support in an Educational Intranet

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**Abstract**: Information and Communication Technologies have changed the way we work, the way we live and the way we learn. One of the things that should be updated regarding the new educational context is the tutorship support, that is specially important in a learning environment. In this communication a definition of the educational system of the Information Society for primary and secondary education is proposed, what is called Educational Intranet. Next, it focus on how should the tutorship support be offered by such Educational Intranet. So, this document describes and proposes an original tutorship support system to be incorporated to an educational intranet for primary and secondary education. The tutorship support can be performed face-to-face, that is to say, in real time using a video-conference system (Synchronous Tutorship Support) or it can be carried out by means of a text-based messages or queries electronic mailbox (Asynchronous Tutorship Support).

## Introduction

A New Space of Education and Communication is coming, which is driven by the culture of Information and Communication Technologies. Schools should be aware of this change and should set up the new objectives and educational methodologies inside this new context. One of the things that should be

updated, regarding that new educational context, is the tutorship support, that is specially important in a learning environment.

The tutorship support plays an important role in the learning process. This fact is true in each learning context in general, but in some cases, such as rural schools, the tutorship function is specially complicated.

Castilla y León, in Spain, is a rural, vast and sparsely populated region, with a lot of small towns and villages. This fact makes difficult to offer the minimum public services. Regarding education, children in rural areas suffer too many drawbacks: larger distances from home to school, a poorer educational offer, remoteness from other educational and cultural services, such as Universities, libraries, museums and Research and Development Centers. It has to be emphasized the fact that teachers have also a lot of added problems: they have to teach children of different ages, with few resources, ...

The use of Information and Communication Technologies (ICT) at primary and secondary schools could decrease the differences between children from rural and urban areas regarding the access to sources of information and services. Moreover, it introduces teachers and students into the Information Society, contributing also to the development of this New Society.

So, in the last decades, the educational infrastructure in the rural areas of our region has changed from a centralized model into a more distributed model based on what is called the GRS or Gathered Rural School, with classrooms distributed in the area of the GRS and some centralized services. The newest element incorporated to this model is the Rural Center of Educational Innovation, where students stay for a long period of time and study some especial matters such as Technology, Music or Art.

The fact is that the tutorship support in the GRS model plays an important and critical role and it must be considered from the perspective of the possibilities of ICT.

So, this document is referred to the use of ICT as a support to the learning process, that is to say, an instrument for teaching and learning, in contrast to the use of ICTs as a subject or as an aspect (Plomp et al. 1997). ICT must be an instrument integrated into the educational process: it is not a substitute for either the teacher or for any other educational tools. Moreover, since technology will actively change the learning process and the pedagogical relationships, ICT should be considered as an important point in the foundation of the learning environment, as the learning theory and the social organization of learning (Pulkkinen, 1999).

In this paper the authors describe their vision about how should the tutorship support be offered by an Educational Intranet for primary and secondary education, which concept is defined below.

## Educational Intranet

Our concept for Educational Intranet is related to an education strongly based on the use of computers. It consists in the fact that students use computers and the Internet (together with some traditional tools) as the cornerstone of their education.

This model is based on the fact that knowledge requires learning by experience, so students should take a more active role in the learning process.

The teaching methods and learning processes are very different from the traditional ones: the traditional curriculum-based education evolves an education based on objectives, guided auto-learning, active learning and cooperative work. It involves a complete change in organization of contents, learning process and pedagogical aspects.

The Educational Intranet defines what we think the educational system of the Information Society should be: a new way of learning, a change in the students and teacher's roles. One of the main advantages of Educational Intranet is that it facilitates a collaborative learning versus the traditional and more competitive one. At traditional schools students were motivated by competition. At new schools, the schools of the Information Society, this objective should be reached by cooperation.

Cooperative learning has a lot of advantages, for example, it increases the motivation and the productivity and it is a good training for future professional team works (Mülhäuser, 1995). When students work in small groups, school time and space are better employed. Teachers can dedicate more time to the least advanced groups or work on different subjects with each group, according to the students' necessities. These strategies are efficient and proven against school failure. Consequently, a more efficient and less expensive learning process can be achieved, due to a decrease in school failure.

Therefore, the Educational Intranet can be defined as a new educational system, where computers, networks, multimedia materials and telecommunication services are basic tools and where new learning methods are used. These new methods are based on guided auto-learning, active learning and collaborative learning.

The Educational Intranet should be based in an Educational Server that offers some distance services:

- Construction of communities around some matters.
- Communication among teachers and students.
- Control of work streams in the educational area: homework, revisions and tests.

This document deals with the tutorship support as a specially important way of communication between the student and his/her teachers. We will describe how the tutorship system should be implemented in an Educational server and we will show an example of pilot project.

## The Tutorship Support System

The tutorship support system we propose for an Educational Intranet is based on the tutorship system implemented by the authors in the pilot project Internet for Schools (see Rodríguez et al. 1998): this pilot consists in different Internet-based services for teachers and students of primary and secondary education. Some of those services are electronic tutorship support and communication among different scholar centers.

The objective of our electronic tutorship system is to put students in touch with teachers of different subjects. Students can ask questions to teachers and obtain answers from them.

Therefore, it is necessary that different teachers from different schools participate as electronic tutors for one or several subjects, in a way that students can communicate with each of them.

The tutorship support can be performed face-to-face, that is to say, in real time using a video-conference system. That is what we call Synchronous Tutorship Support. Or it can be carried out by means of a text-based messages or queries electronic mailbox: Asynchronous Tutorship Support. Both types of electronic tutorship support are being implemented together in a new educational server.

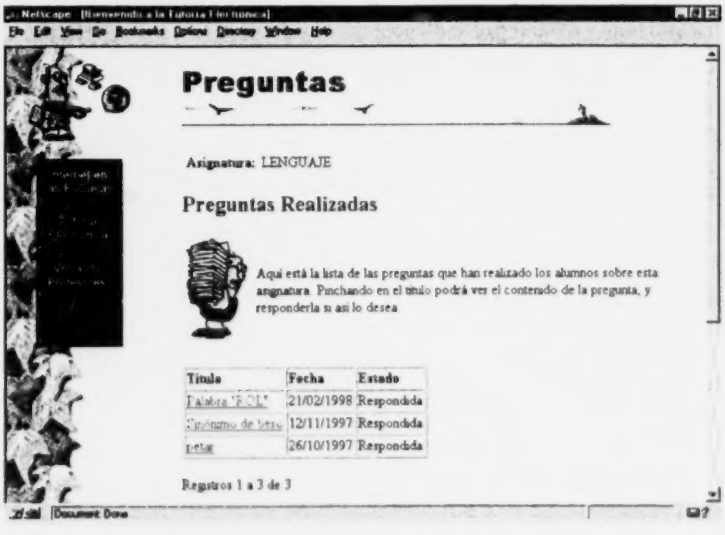
Preguntas
Asignatura: LENGUAJE
Preguntas Realizadas
Aquí está la lista de las preguntas que han realizado los alumnos sobre esta asignatura. Pinchando en el título podrá ver el contenido de la pregunta, y responderla si así lo desea
Título
Fecha
Estado
21/02/1998 Respondida
12/11/1997 Respondida
26/10/1997 Respondida
Registros 1 a 3 de 3

**Figure 1**: A tutor accessing to the queries about Language introduced by several students. All questions have been answered by other teachers and the tutor could see the answers or introduce a new one.

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### The Asynchronous Tutorship Support

Asynchronous communication provides freedom from the constraints of time and place and it involves more reflective thinking (Pulkkinen, 1999), so it is a powerful aid for the tutorship support in an open learning environment.

The Asynchronous Tutorship Support proposed makes use of a text-based messages electronic mailbox. In order to facilitate and make more flexible the work of teachers and also enrich the tutorship support process itself, the system works as described below: a student send a query to the electronic mailbox established for a certain subject. All teachers that have been subscribed for that subject can deal with the query, introduce his/her answer and access to the answers introduced by other teachers. That is, it is possible for a student to obtain more than one answer to a query. This system was implemented and tested in the pilot project Internet at Schools (Fig. 1 and Fig. 2).

Respuesta
Esta es la respuesta facilitada por uno de los profesores
Nombre: Miguel Angel
Apellidos: Fernández Cabrero
E Mail:
Fecha: 09/01/1998
Respuesta: petar es un término de procedencia gallega que significa golpear contra algo
Volver
Última modificación. 14/10/97

**Figure 2**: A student accessing to the answer to one of his or her questions. The student can see data about the tutor who dealt with the query (including a photography) and communicate directly with him by e-mail.

### The Synchronous Tutorship Support

The Synchronous Tutorship Support proposed is based in a desktop video-conference system. The video contact provides a human face and dimension to the distance communication, which is so important in an educational environment (Wright & Cordeaux, 1999).

The system proposed works like a web call center. More than one teacher can be available to contact with. A student will be able to select the teacher who he wants to communicate with using video-conferencing, from all of them being on-line. The communication will be established on a peer-to-peer basis between the student and the selected tutor (Fig. 3).

Students can always make use of other communication tools, also synchronous or asynchronous, like text conferencing, e-mail or the asynchronous messages electronic mailbox.

## Conclusions

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This document describes an original tutorship support system to be incorporated to an educational intranet for primary and secondary education. The combination of a synchronous and an asynchronous tool provides accessibility and flexibility to the distance learning environment. Both of them involves a group of tutors which students could communicate with, the first one by means of a desktop video-conference system and the second one by a text-based messages electronic mailbox. This asynchronous part of this system has been used before in a pilot project, and has been demonstrated to be a completely new and efficient method of tutorship support.

That model of tutorship support and its practical implementation have been included in the curriculum of a doctoral course at the Faculty of Pedagogy of the University of Salamanca (in Spain).

**Figure 3**: A student communicating with a tutor by means of the video-conference system.

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Pulkkinen, J. (1999). Pedagogical foundations of open learning environments. In M. Selinger & J. Pearson (Eds.), *Telematics in Education: Trends and Issues*. The Netherlands: Elsevier Science. 76-87.

Rodríguez, B., Verdú, M. J., Pérez, M. A., Navazo, M. A., López, R., Mompó, R., & García, J. (1998). Internet for School: educational Web for Children Living in Rural Areas in Castilla y Leon Spanish Region. *International Journal on Information Theories & Applications*, 5 (3), 84-88.

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# Active Server Page Programming Tutorial

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**Abstract:** This paper describes a web-based Active Server Page (ASP) Tutorial that provides an interactive online guide for ASP programming. The application was created using a variety of technologies including ASP and Macromedia Flash to implement the interactive segments of the tutorial. All the sample codes written in ASP can be demonstrated online. Flash movies are used to provide online, side-by-side ASP code interpretation. This site is intended to provide an easy-to-follow, step-by-step tutorial for inexperienced ASP programmers. The ASP Tutorial introduces ASP syntax and the basics of ASP programming. Using an interactive style, this tutorial provides fully commented easy to follow examples, programming techniques, and quizzes. Both linear and random navigation are provided on every page so the user can easily find topics of interest.

## Introduction

The ASP Programming Tutorial (http://138.87.169.64:2012/index.htm) was developed to provide an interactive online guide for Active Server Page programming. The target users include undergraduate and graduate students who are interested in ASP programming. However, anyone interested in learning ASP could benefit from this tutorial application. For years, faculty members have relied on textbooks and assignments to cover and drill programming language specific concepts and syntax. However, some of the difficulties faced by the students in grasping these concepts are the limited scope of the assignments and the lack of opportune feedback. In order to strengthen students' understanding of these concepts and syntax, they need to have more immediate feedback when solving assignments than traditional textbooks and teaching methods can provide.

In order to provide students with a different type of learning environment, it was decided to develop a supplemental tool for teaching ASP scripting. Providing students easy and convenient access to the information both at school and at their place of residence was also an objective of the project. To meet these objectives, a web-based tutorial was designed and implemented using HTML, ASP, and Macromedia Flash.

Active Server Page (ASP) is one of Microsoft's Web server application development technologies. Web developers can use ASP technology to dynamically generate browser-neutral content using server-side scripting. An ASP file is usually an HTML file that includes one or more scripts (small embedded programs) that are processed on a web server before the page is sent to the user. The ASP code can be written in a number of scripting languages including JavaScript, JScript, VB script and Perl (Practical Extraction and Report Language). However, the default scripting language for ASP is VBScript.

## Contents of the Tutorial

ASP Programming Tutorial consists of primarily textual content explaining the basics of ASP programming. Some of the topics covered in the tutorial include:

- What is ASP -- Definition, servers supporting ASP
- Client/server -- N-tier model
- Scripting -- Scripting vs. programming, compiled vs. interpreted.
- Why ASP -- Advantages, characteristics
- Structure of an ASP application
- ASP Objects and Server Variables
- User Interaction (HTML forms)
- Web Database Connectivity
- ODBC and DSN System
- ActiveX Data Object Connection
- Cookies and Session Control
- Interactive Examples
- Interactive Quizzes

The ASP Programming Tutorial is divided into the following 5 major topics: What is ASP, Getting Started, User Interaction, Session Control, and Web Database Connectivity. A consistent organizational template is used to structure each topic so that people taking the tutorial quickly become familiar with the procedure followed in the tutorial. First, the user is presented with a coherent, progressive set of lessons that cover the current topic. The lessons are followed by an interactive programming example that elucidates the concepts covered. And finally, an interactive quiz is provided for self-testing.

The lessons are normally text-based presentations of the topics. However, when appropriate, Flash movies are included to help the user visualize the concepts being presented. For example, the client/server architecture lesson includes a movie. This movie steps through the interaction between client and server using animation and voice over narration. See Figure 1.

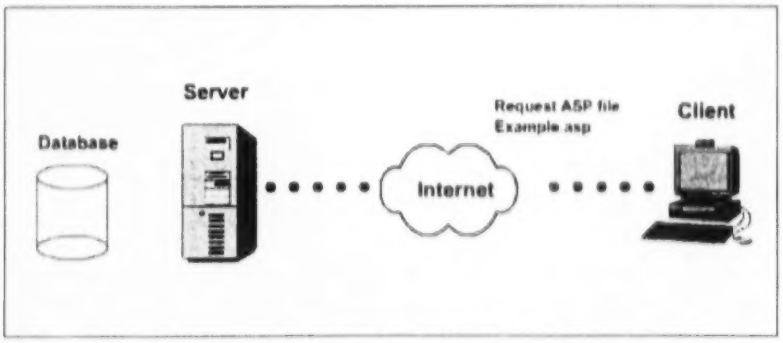


**Figure 1**: Client/Server Interaction Movie Implemented in Macromedia Flash

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The interactive programming examples have been implemented using Macromedia Flash. These program examples illustrate ASP code structure, user interaction, server variables, session control, cookies, and web database connectivity. Each of these programs introduces ASP syntax via meaningful examples that are explained in detail when interacting with the program. The event of a user placing the mouse over a section of code triggers the display of a window which explains that code segment. In addition, all of the examples can be downloaded and executed upon request. Figure 2 is a screen capture of one of the example programs with added explanatory labels.

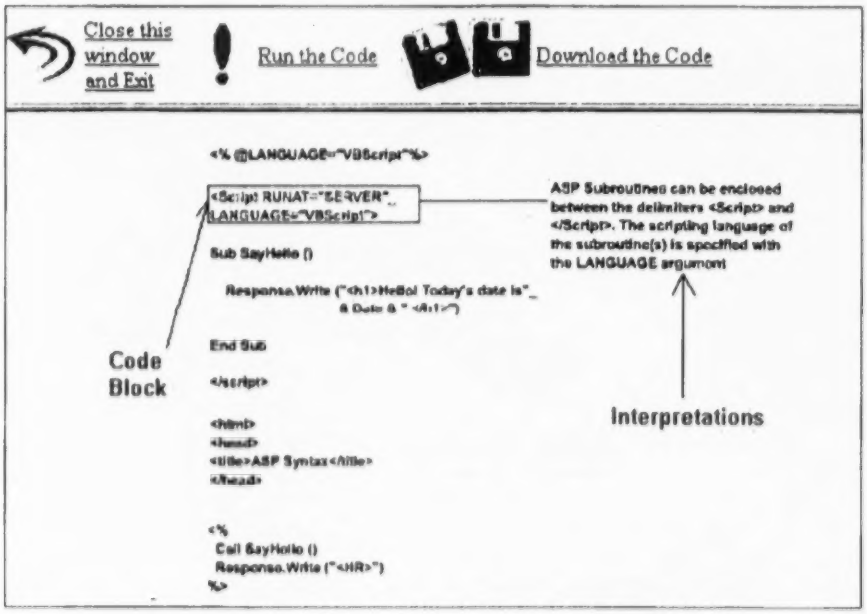


**Figure 2**: An Interactive Programming Example Implemented in Macromedia Flash

Both linear and random navigation are provided on every page so users can easily find topics of interest. Figure 3 shows the typical screen layout and navigation options. At the left of the screen a navigation panel shows the major sections of the tutorial and highlights the user's current location within the tutorial. Using this panel, the user can navigate the tutorial in a non-linear or random fashion by selecting the topic he/she wants to visit. Linear navigation has been implemented by traditional arrow icons pointing left and right for previous page and next page navigation within the tutorial. Additionally, a horizontal menu bar listing commonly used utilities, such as a glossary of terms, site map, and links to relevant ASP sites, is included at the top right most corner of the screen.

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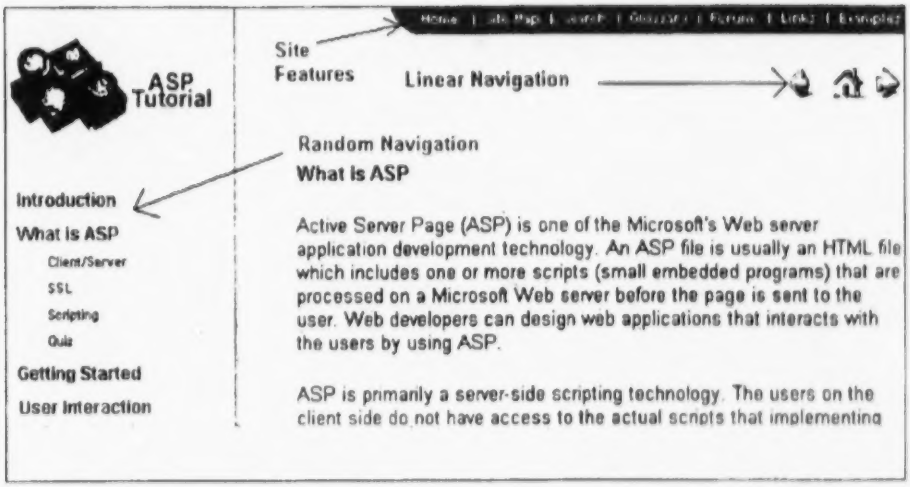
ASP Tutorial
Site Features
Linear Navigation
Random Navigation
What is ASP
Introduction
What is ASP
Client/Server
SSL
Scripting
Quiz
Getting Started
User Interaction
Active Server Page (ASP) is one of the Microsoft's Web server application development technology. An ASP file is usually an HTML file which includes one or more scripts (small embedded programs) that are processed on a Microsoft Web server before the page is sent to the user. Web developers can design web applications that interacts with the users by using ASP.
ASP is primarily a server-side scripting technology. The users on the client side do not have access to the actual scripts that implementing

**Figure 3**: Screen Layout and Navigation Options of the Tutorial

The utilities referenced in the menu bar provide an effective way for the user to interact with the web-based tutorial. For example a full-text search function is available to the user for finding available references within the site. An interactive site map utility allows users to visualize the content and provide hyperlinks to any of its sections. Figure 4 shows the graphical site map.

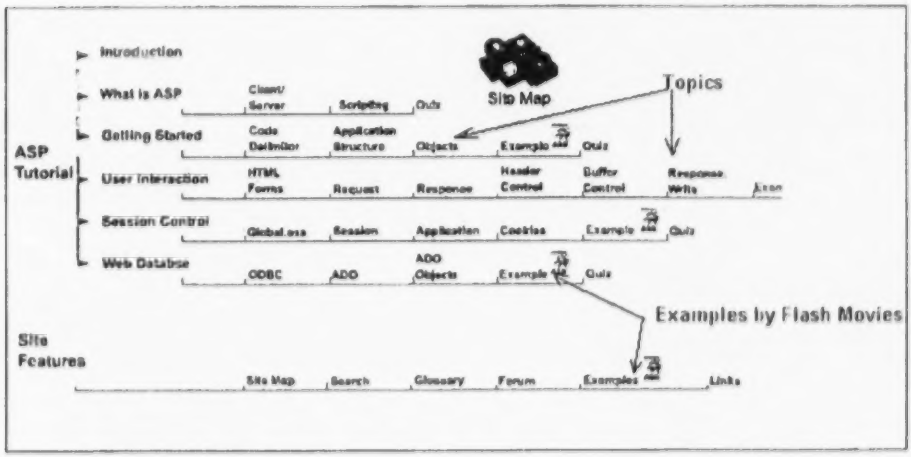


**Figure 4**: Tutorial Site Map

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The glossary function for this site contains a navigation panel with a tree-like structure where the user can select the term he/she wants defined. See Figure 5.

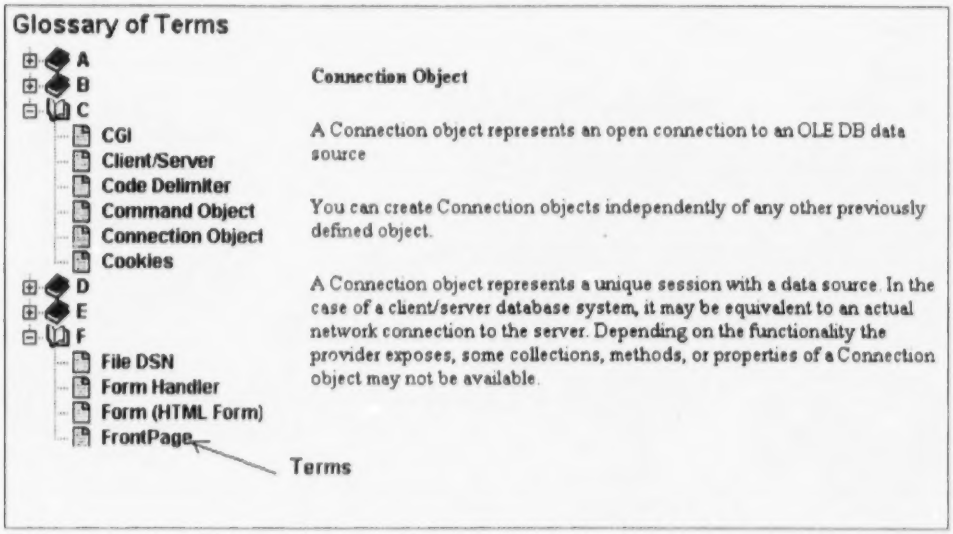
Glossary of Terms
A
B
C
CGI
Client/Server
Code Delimiter
Command Object
Connection Object
Cookies
D
E
F
File DSN
Form Handler
Form (HTML Form)
FrontPage
Terms
Connection Object
A Connection object represents an open connection to an OLE DB data source
You can create Connection objects independently of any other previously defined object.
A Connection object represents a unique session with a data source. In the case of a client/server database system, it may be equivalent to an actual network connection to the server. Depending on the functionality the provider exposes, some collections, methods, or properties of a Connection object may not be available.

**Figure 5:** Glossary of Terms

## Conclusions

There are numerous books available that cover these ASP Programming topics thoroughly. However, books have their limitations in a learning environment. For example, they are static by nature. Though they may be able to explain concepts in great detail, they still do not present students with an opportunity to study and learn concepts in an interactive fashion. Actually using or applying the concepts helps students improve their understanding of the subject matter. This limitation of textbooks can be effectively rectified by using interactive instructional multimedia technology like the web-based tutorial presented in this paper. Another advantage of this type of application is that students can effectively interact with a web-based tutorial anytime and anywhere when connected to the Internet.

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# Teachers On-Line in Africa: The Issue of Access

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**Abstract:** South Africa is on the threshold of drastic changes in the field of education. The ideal is to move away from the stereotyped teaching methods and passive learning to a learner-centered approach. This is linked to efforts to address inequalities in education and to overcome historical disadvantages. One of the major stumbling-blocks, however, is the relatively underqualified teacher corps and the massive undertaking of the retraining of ten thousands of teachers - many of them in re90%mote areas, far from the larger training centers. A lack of basic infrastructures further complicates the situation. The major issues addressed in this paper concern the availability of the necessary infrastructure and technology for the delivery of effective learning opportunities, and the nature of several innovative projects inclined to create learning communities of educators and learners that use Information and Communication Technologies (ICTs) to enhance education.

## Orientation

South Africa is on the threshold of drastic changes in the field of education. The outcomes-based education (OBE) model, Curriculum 2005, is in the process of being implemented in South African schools. The ideal is to move away from the stereotyped teaching methods and passive learning to a learner-centered approach according to which the pupil is actively engaged in constructing his/her own knowledge and comprehension. This ideal is linked to efforts to address inequalities in education and to overcome historical disadvantages.

Other important initiatives are currently being launched in the country. As far as technology in education is concerned, an example is a ministerial investigation into technology-enhanced learning [Technology Enhanced Learning Investigation (TELI) 1996] which has synchronized with the development of Curriculum 2005 since 1995. Special emphasis is placed on the role of technology and other resources in the process of reconstruction: "... old and new technologies have the potential to help tackle critical problems of access, redress, flexibility, and relevance" (TELI 1996 p.7).

One of the major stumbling-blocks in the process of change, however, is the relatively underqualified teacher corps and the massive undertaking of the retraining of tens of thousands of teachers in the OBE mode of thinking, as well as the upgrading of their qualifications to the accepted standard of a four-year tertiary qualification. Many of these teachers find themselves in remote areas, far from the larger training centers. A lack of basic infrastructures such as electricity, telephones and adequate transport facilities further complicates the situation. The nature and extent of these problems were clearly revealed in several national surveys like the National Teacher Audit (Hofmeyr & Hall 1996), the School Register Needs Survey of 1996/97 with regular updates [Research Institute for Education Planning (RIEP) 1997], and the Science/Mathematics Teacher Survey undertaken by EduSource (1997).

But can the introduction of computer technology in any way promote the process of change? Is it realistic to consider on-line education as a mode of tuition when principles such as cost-effectiveness and equal opportunities for all are at stake? What about the availability of the necessary infrastructure and technology for

the delivery of effective learning opportunities, i.e. the issue of access? And what is being done to bring teachers and learners in contact with the new on-line world of information?

## The Issue of Access

For many countries, and particularly those in the developing world, the lack of network and telecommunication infrastructure is considered the major obstacle to Web-based education. In his set of guiding principles and practices for the design and development of distance education, Ragan (1999 pp.3-4) states as principle that the selection of instructional media and tools should reflect their accessibility to learners. In countries like the United States, quality concerns are more likely to relate to the lack of capacity or band-width within their computer/telecommunications networks. Institutional needs for network and desktop hardware, software, support and training are also considered as major factors in the growth of on-line distance education in the developed world (Broad 1999 p.8).

Like many other developing countries, South Africa is battling with the challenge of harnessing information and communication technologies effectively to accelerate social development. Most debate in this regards tends to center on the extent to which the adoption and use of these technologies can contribute to reducing the massive inequity that exists among and within societies. These debates often tend to reflect a simplistic conviction that Africa will benefit from the development of advanced communication. This type of observation is sometimes tempered with some awareness of the danger that the explosive growth of these technologies may serve to entrench disparity rather than eradicate it [South African Institute for Distance Education (SAIDE) 1999 p.1].

It is important to note that, of the 750 million inhabitants on the African continent, only about 2,85 million are using the Internet on a regular basis - with 1,82 million linking up from South Africa. This is perhaps an encouraging figure, indicating a high level of technological advancement in the country in comparison with the rest of the continent, but it also means that roughly only 6% of the South African population link up regularly. The cost of computer equipment and the lack of basic infrastructures are held as the most important reasons for the relatively slow growth figure of the Internet in South Africa, but it is expected that, in future, cordless Internet (WAP) can play a major role to bring the Web to the masses by means of cell phones and handheld computers (*Sake* 2000 p.3).

But what about epistemological access? Lelliott, Pendlebury and Enslin (2000) rightfully warn that physical access is not sufficient; at the very least, epistemological access to on-line education requires students and their teachers to become computer literate as well as conventionally literate and numerate - and even more so in the field of teacher education with its very special demands.

These are the challenges. Information communication technologies clearly do have the capacity under appropriate circumstances to reach large numbers of learners through a few well-qualified tutors using materials developed by specialists. It does not ask for an Internet connection to each household, because a properly equipped learning center within walking or cycling distance from every household, no matter how remote, can serve a similar purpose. We must also remember that, at present, the prerequisite of access can be met by very few countries, even in the world.

## Availability of Infrastructure and Technology

When the realities of the South African education are regarded, the picture for a possible technology-enhanced approach in education does not appear bright at all. The picture becomes even bleaker when the possibility of on-line education is considered. In the first place one must realise that South Africa has a very big and extensive education system which is governed by a National Department and nine provincial education departments. In 1999 there were approximately 12.3 million learners in South African schools, attending 29 386 schools with just over 375 000 educators. [Department of Education (DoE) 2000]. The majority of these learners (more that 80%) can be considered as from developing communities.

The School Register of Needs Survey (first conducted in 1996/97 by a consortium of research-based institutions) provides a comprehensive database of the physical facilities, equipment, resources and services available at almost 28 000 primary and secondary schools in the country. It was, for example, found that more than half of the schools lack basic administrative equipment like typewriters and computers. A shortage of

more than 57 000 classrooms nationally was reported, while learner laboratories in secondary schools showed acute shortages (RIEP1997; The Teacher September 1997). Fewer than half of the schools (43%) nationally had an electricity supply. With the exception of the Northern Cape, Western Cape and Gauteng, most schools had no telephone lines. In the Free State it was found that only 25% of the more than 2900 schools had a telephone; duplicating facilities were only available at 17% of the schools; with a 19% availability of overhead projectors, 11% video recorders; and 6% computers (RIEP1997). All this information indisputably indicates only a limited applicability of the ideals of technology-enhancement in education. "What this means is that in a world increasingly wired up and becoming a global village because of advanced technology...there are thousands of schools and millions of South African children who are getting left behind in this information era simply because they cannot be reached" (The Teacher September 1997 p.3).

The School Register of Needs is regularly updated. The most recent data for the Free State province (made available by the Free State Department of Education) shows some improvements in electricity supply, telephones and also in the availability of computers at schools. In 2000, 83% of the schools now have an electricity supply. Telephones are available at 43% of the schools, with mostly rural and farm schools who are missing out in this regard. Just over 5 100 computers are in use in 600 of the schools (24%). This still means that 76% of all schools in the province (1334 rural and 600 other) are still without a single computer! Furthermore, an analysis of the designation of the 5 100 computers shows that most of these computers reside in well-equipped laboratories in schools in wealthy urban and semi-urban communities. These laboratories were mostly established by school governing bodies who used their private school funds for this purpose. Roughly 150 of the schools with computers are linked up and has Internet and/or E-mail facilities to facilitate communication with the provincial department of education. About 15 schools also have their own Web-sites.

The above statistics highlight the major inequalities that still exist among schools in different communities in this province, and it can be accepted that the pattern will not differ much throughout the country.

During interviews with officials of the Free State Department of Education, several of them clearly stated that computers and computer education are not priorities at this stage. This viewpoint can be understood when it is taken into consideration that education in the province suffers from a shortage of funding and that there is still a battle to erase the effects of the unequal distribution of money in the apartheid era. According to the TELI report, inequalities have to do with many aspects, *inter alia*, the poor physical infrastructure in many areas, poor communication, insufficient provision of library services and other resources, poor training facilities, people who are not yet ready for high technology strategies, and a lack of a supportive learning environment for pedagogical and professional development. The fear is therefore expressed that the introduction of technology will further broaden the gap between the urban and the rural areas (TELI 1996 pp.34-36). There are, however, also other views. Other officials, however, feel that all learners and teachers have a right to be introduced to the new technologies and the new world of information yet unknown to them. In accordance with the views of Carl (1995 pp.2-3), they believe that technology can be the bridge to equality for all and that advanced technology can make a "quantum leap" possible.

When it comes to higher education in South Africa, research shows that most students in the formerly disadvantaged communities do not have access to basic technologies such as the telephone and audio recorders. Beneke (1998) reports on the availability of technology to students studying through Vista University Distance Education Campus (more than 60% in teacher education programs), as determined in successive surveys undertaken in 1989, 1994 and 1998 (see Tab. 1). He shows that limited numbers of students had access to computers and, with a mere 20 – 40% accessibility to telephones, it is quite obvious that online education, for example, would not have been possible for most of these respondents.

| Technology/Year | 1989 | 1994 | 1998 |
|---|---|---|---|
| Radio | 75 | 82 | 88 |
| Audio equipment | 16 | 57 | 48 |
| Television | 14 | 45 | 82 |
| Computer | 1 | 3 | 5 |
| Telephone | 25 | 40 | 30 |

**Table 1:** % availability of technology to Vista University distance education students in 1989, 1994 and 1998.

In accordance with the research of Beneke, the authors conducted a survey among three groups of students at the Free State Technikon and Vista University. Group A represents 47 second-year students in the

IT department and Group B 150 first-year students in a Computer Literacy class in the Faculty of Management at the Technikon Free State. Group C represents 43 final year teacher education students at the Bloemfontein campus of Vista University (see Tab. 2).. All the students are from formerly disadvantaged communities. Although the high accessibility figure to electricity (93%+) looks encouraging, a situation like this is unthinkable of in a developed country, namely that more than 60% of a group of students in a second-year computer science course and more than 90% final year teacher education students did not have access to a personal computer. The 10% and lower linkage to Internet and E-mail respectively, indicates that on-line education is at present just a far-off dream to these three groups of students. This is despite the fact that all these students are basically computer literate, because all students in non-computer science courses have to follow a one-year computer literacy course at their institutions.

| Technology/Group | Group A (N=150) | Group B (N=47) | Group C (N=43) |
|---|---|---|---|
| Electricity | 93 | 100 | 95 |
| Radio | 91 | 98 | 95 |
| Television | 82 | 95 | 88 |
| Satellite TV | 5 | 7 | 5 |
| Telephone | 55 | 60 | 58 |
| Computer | 7 | 38 | 8 |
| Printer | 5 | 31 | 5 |
| E-mail | 3 | 10 | 3 |
| Internet | 3 | 7 | 3 |
| Audio recorder | 55 | 40 | 50 |

**Table 1**: % availability of technology to students at Technikon Free State and Vista University

In further surveys undertaken by the authors, teacher education students and practicing teachers were asked for their views on the possibility of INSET and PRESET programs offered at a distance by means of Internet/E-mail. Most students reacted positively to the possibility of on-line education, but great concern was expressed regarding the inaccessibility to computer equipment and the cost involved. Another great concern involves the lack of an "ever-present" lecturer as well as a possible lack of contact with other students. The important aspect of the technological literacy of tutors as well as students was also mentioned. A fundamental principle was touched upon by one respondent who wrote: *"All people must be given a chance to know more, also about computers"*. This remark again highlights the burning issue of equal opportunities to all in a country where such great disparities between the richer and the poorer still exist.

But what is the solution? Nobody really knows. In South Africa the problem is addressed by means of deliberate efforts by tertiary institutions, industry, the private sector, the national and provincial governments, international agencies and others to make money available and introduce innovative projects that may break this vicious circle of ever-increasing disparity.

## Projects and Other Initiatives in Progress

### National level

SchoolNet SA (at www.school.ac.za) is the most important national organization that has to be mentioned. It is linked to the National Department of Education in the country and organizes, manages and co-ordinates on-line activities on school level or, in its own words: "... an organisation formed to create Learning Communities of Educators and Learners that use Information and Communication Technologies (ICTs) to enhance education" (www.school.za/about.htm). It has core funding from the International Development Research Centre (IDRC) - a Canadian donor organisation - and Open Society Foundation for SA, with project funding from the World Bank Institute and a range of corporate partners. SchoolNet SA is currently involved in initiatives and projects such as the national Minister of Education's Tirisano Project, the Telkom 1000 Schools Internet Project, the Thintana i-learn Project, the Nortel Phumelela Networks Project, and several others.

Special mention needs to be made of the Thintana i-Learn Project. It is funded by Thintana, a consortium of the national communications network, Telkom, and its strategic equity partners - SBC International and Telkom Malaysia. The consortium provided R21, 2 million ($3M) to set up computer centers in 200 disadvantaged secondary schools equally distributed in all the nine provinces and to train a minimum of ten educators per school. Each of these schools will receive between ten and twenty networked computers with Internet connectivity. This project will be implemented over a two-year period. The strength of the project has attracted the partnership of the world-wide computing software leader, Microsoft, funding the cost of software to the value of R5,9 million ($0,75M). The project, which will be managed by SchoolNet SA, forms part of Thintana's commitment to invest R120 million ($15,5M) from 1997 to 2002 on a series of educational programs that will improve technology learning and bring future generations to a knowledge-based society.

**Free State Initiatives**

The Department of Education in the Free State province is also involved in several projects to provide schools in developing communities with computers and get them linked up. In 2000 the national telecommunications company, TELKOM, provided 133 schools with a computer and provided some training to a few teachers at each of these schools as part of its national Telkom 1000 Schools Internet Project. The idea was to get each school connected via E-mail and the Internet. In 2001 further training of teachers will be undertaken by SchoolNet SA through 28 so-called TELKOM Super Centers.

Many of the farm schools in the province still lack essential facilities like electricity and telephones. In the eastern part of the Free State (near the Lesotho border) private companies are planning to get rural schools connected via satellite communication. In one remote area an innovative project is even using solar energy to get computers and the Internet going!

From the side of universities, colleges and technikons in the Free State, the possibilities of on-line education in reaching students in remote areas are slowly being exploited. Several on-line programs have been implemented or are in the process of implementation - with the Technikon Free State (at http://eswot.tofs.ac.za) that has taken the lead in this regard. Other innovative projects between institutions and schools are opening the new world of ICTs to teachers and learners in these schools. Two of them are briefly discussed:

The *Thutamahlale Upliftment Project* at Vista University in Bloemfontein forms part of the South African Science Education Network (SASEN), a project sponsored by the Flemish government. Four South African Universities and the University of Leuven in Antwerpen, Belgium, are the partners in the project. The purpose is to develop interest and enthusiasm, as well as to provide teachers with teaching strategies and computer literacy skills they can apply in the context of the outcomes-based Curriculum 2005 in Grade 7-8 classrooms. The project is aimed at establishing science, technology and computer laboratories on the university campus, and at presenting workshops to 90 teachers and providing 32 teachers with computer literacy skills. The SASEN computer laboratory was completed during 2000 and the computer literacy part of the project could be implemented. The participating teachers are now attending workshops one afternoon per week and they already received training in basic computer skills and application software. The progress of the teachers is carefully monitored. The challenge, however, is to assist these teachers in utilizing their newly-found skills effectively in environments where one computer has to serve a school with more than a 1000 learners!

With the aim of playing an active role in the community and in support of the National Education Department's Tirisano Project 2000-2004, the Technikon Free State (TFS) launched its *TFS/Lereko Adopt-a-School* program in September 2000. In the first phase of the program, the emphasis has been on the professional and personal growth of Lereko's teachers, with computer literacy as one of the main objectives. The TFS equipped a computer laboratory with Internet facilities at the school, and is now providing training to the teachers. The Department of Information Technology at the TFS handles the IT component of the program. It will carefully monitor the progress of the teachers over the next twelve months and will adapt its training to the teachers' needs.

## Concluding thoughts

This discussion has provided a rather bleak picture of the possible large-scale introduction of computer technology and on-line education in South African schools and institutions of higher education. The problem of

access - informed by a lack of funding, the high cost of technology and the unavailability of basic infrastructures - seems to be the major stumbling-block in this regard. And if the possibility of on-line teacher education is considered as a viable option for INSET and PRESET purposes in South Africa, the issue of access (including epistemological access) clearly constitutes a major challenge. With the rapid growth in the use of the information communication technologies in the more advanced section of the South African community, fears that the gap of inequality in this regard is rapidly widening, need to be addressed. Projects to counteract this vicious trend need to be supported. More funding, also from international donor communities, need to be attracted. The country's progress can only be served if educators are open to innovation and change and willing to tackle all the challenges, including the issue of access, in a creative and innovative way. As far as the aspect of equality is concerned, it is appropriate for all those concerned with education in South Africa to pay attention to the warning words of Apple (1992 p.86): "... The new technology is here. It will not go away. Our task as educators is to make sure when it enters the classroom it is there for politically, economically, and educationally wise reasons... We should be very clear about whether or not the future it promises our students is real and not fictitious. We need to be certain that it is a future all of our students can share in, not just a select few".

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